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U.S. DEPARTMENT OF INTERIOR
1620 L. STREET, N.W.
WASHINGTON, D.C. 20036

Audit of Trans-Alaska Pipeline System

BY

QUALITY TECHNOLOGY COMPANY

QUALITY TECHNOLOGY
COMPANY
201 WEST 3RD,
LEBO, KANSAS

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November 1, 1993

Dr. Jeffrey F. Zabler
Senior Projects Manager
Bureau of Land Management (BLM)
U. S. Department of Interior
1620 L St., N. W.
Washington, D.C. 20036

Dear Dr. Zabler:

Subject: Final Report of Audit on Behalf of BLM
of the Trans-Alaska Pipeline System (TAPS)
by Quality Technology Company (QTC)

Enclosed is the Final Report of Audit on Behalf of BLM of the Trans-Alaska Pipeline System (TAPS) by Quality Technology Company (QTC). As demonstrated by the findings in the attached report, the assessment by the BLM that such an audit be required was entirely valid and essential not only to the security of the TAPS as a strategic project for this country, but to protect the public health and safety, and the environment/ecosystem. This audit effort was also essential to identify not only hardware issues, but the programmatic and process control issues that currently affect the integrity of the TAPS hardware.

This effort was especially critical at this time when the hardware is aging, the through-put is decreasing, and personnel reductions are being contemplated.

Had the BLM not recognized the need for the type of audit undertaken to determine areas of imminent threat and other potential problem areas, coupled with the need to assure strong corrective actions and oversight by the BLM/JPO, it is the belief of the BLM/QTC audit team that the future of the TAPS and its beneficial effect on the health and safety of the public and the environment/ecosystem would be in serious jeopardy. Without the strong leadership of the BLM, it is the audit team's assessment that this essential identification of problems would not have occurred absent a possibly major accident or oil spill's occurring.

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Although the audit team identified many areas of strong concern, it is appropriate to also recognize the extraordinary measures undertaken by Alyeska to support the total efforts of the audit team. Especially appreciated were the efforts of those Alyeska personnel who responded to the audit team's needs in the areas of supplying of documents, arranging interviews, coordinating travel arrangements, and other mundane but essential support activities without which successful completion of the audit team's activities would have been impossible in the short turn-around time available. The cooperation of these individuals in particular and of Alyeska upper management in assuring that such cooperation was possible and available is much appreciated by the audit team.

As we have previously discussed, I will be hand-delivering this letter and the attached report directly to you in Washington, D.C.

Respectfully submitted,

QUALITY TECHNOLOGY COMPANY (QTC)

Owen L. Thero

Owen L. Thero
President

Attachment: Final Report of Audit on Behalf of BLM of the Trans-Alaska Pipeline System (TAPS) by Quality Technology Company

FINAL REPORT OF AUDIT ON BEHALF OF BLM
OF THE TRANS-ALASKA PIPELINE SYSTEM (TAPS)
BY QUALITY TECHNOLOGY COMPANY (QTC)

November 5, 1993

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Air stripper motors have improper labeling

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FINAL REPORT OF AUDIT ON BEHALF OF BLM OF THE TRANS-ALASKA PIPELINE SYSTEM (TAPS) BY QUALITY TECHNOLOGY COMPANY (QTC)

November 5, 1993

BACKGROUND

On August 25, 1993, the U. S. Department of the Interior, Bureau of Land Management (BLM), and Quality Technology Company (QTC) executed the contract which provided for QTC to investigate the physical and management conditions of the Trans-Alaska Pipeline System (TAPS) and the Alyeska Pipeline Service Company and its contractors. QTC was tasked to identify and verify through investigation and analysis which problems, if any, are immediately hazardous and which do not pose an immediate threat. The BLM outlined in Appendix A of the contract the following areas of primary emphasis:

TECHNICAL:

CORROSION

- Incidence of corrosion
- Corrosion protection and detection system

LEAKS/SPILLS

- Incidence of leaks/spills
- Leak detection system
- Adequacy of oil spill prevention system ("OSCP") planning
- Adequacy of training, staffing, equipment needed for OSCP

NATURAL HAZARDS

Earthquake/earthquake monitoring

Glacier surging

slope stability

river erosion

permafrost thaw

rock bolts

OIL STORAGE TANKS

Integrity/conformance with standards

Bulk storage tanks at pump stations and Terminal are classified as "break-away" but not all have been tested internally

And the absence of adequate monitoring facilities for gas emissions

Improper use of surge tanks for refining feed stock

VALVES

Resistance valves [sic] for insulating flanges for loading arms at Valdez Terminal do not meet specifications

Various (RGV 73, 98, 98A) commanded and uncommanded valve shutdowns due to failures

FINAL AUDIT ON BEHALF OF BLM OF THE TRANS-ALASKA PIPELINE SYSTEM (TAPS) BY QUALITY TECHNOLOGY COMPANY (QTC) (continued)

PRESSURE VESSELS

Noncompliance with State requirements (pressure vessel testing)

Failure to test pressure vessels according to State standards

ELECTRICAL PROBLEMS

Weeping wires at pump stations and Valdez Terminal - potential fire/safety threat

Cable trays at Valdez Terminal tangled/improper mix of high and low voltage cables

REFINING ["Topping"] UNITS

Increased natural gas liquids (NGL) in pipeline causing improper/inadequate relief venting/flare capacity

Hydrogen sulfide (H2S), Nitrous Oxide ("NOX"), benzene emissions and the absence of adequate monitoring facilities for gas emissions

SAFETY SYSTEMS

Welds on fire water systems are not full penetration welds

Foam system at Valdez Terminal inoperable for 3 years

USE OF UNCERTIFIED MATERIALS

Material used for Atigun reroute was uncertified

Uncertified materials used for welding at Valdez Terminal

MANAGEMENT:

MONITORING/OVERSIGHT

Pipeline systems monitoring/adequacy

Adequacy of oversight systems

Documentation/reports, guides, and checklists

Follow-up procedures/practice

Adequate staff/training

UNAUTHORIZED PRACTICES/INCIDENTS

Overriding Quality Assurance Manual (QA) #36

Unauthorized project supervisors

Failure to implement QA-36, revision 5

Violations of National Board inspection codes

Violation of State regulations

Editing/falsifying inspection reports to conceal findings

Construction of ballast water treatment impound basins begun before all inspection criteria were prepared

PS-6 Heat Exchanger not inspected since 1982

Air stripper motors have improper labeling

LABOR PRACTICES/CONDITIONS

Some Alyeska technicians do not have certificate of fitness (Electrical)

Alleged drug and alcohol abuse

The task with which QTC was charged was not to go further than identifying imminent threats and other conditions adverse to quality (i.e., not go further to develop and recommend solutions).

The contract provided a confidentiality agreement which could be executed between QTC and persons specifically requesting confidentiality. QTC's method of performing the audit was based upon a vertical slice approach. This approach allowed the audit team to review the following areas on a sample basis which would identify programmatic and hardware issues which may affect the health and safety of the public, the environment and the ecosystem, through the processes and programs implemented by Alyeska in the operation and maintenance of the TAPS.

The areas included in the vertical slice were:

A. Management Controls

B. As-Built Conformance

Verification of As-Builts

a. Piping systems

b. Electrical raceways

c. Electrical cables

d. Steel structures (welded and bolted)

C. Procurement, Receiving, and Storage

D. Maintenance

E. Equipment Control

F. Motor Operated Valve Maintenance Program

G. Preventive Maintenance (PM)

H. Special Processes

I. Cleanliness Controls

J. Housekeeping Controls

K. Document Control

L. Precision Maintenance and Test Equipment (PM&TE)

M. Work Control, Tests and Experiments Program

N. Lessons Learned Program

O. Audit Program

P. Inspection of Erosion/Corrosion Monitoring

Q. Fitness for Duty (FFD)

At the request of the BLM, QTC developed the following definitions pertaining to the method of reporting the severity of any problematic issues uncovered by the audit team:

DEFINITIONS

Deficiency: A defect or adverse deviation from applicable industry good practices, codes, standards, specifications, or other controlling documents.

Imminent Threat: An imminent threat is a deficiency or combination of deficiencies in or across design, construction, maintenance, operations, program, or management, such that were it to remain uncorrected, could adversely affect the safe operation of the project. Safe operation means operation of sufficient manner and quality to assure the protection of health, safety, and environment.

IMMINENT THREAT CLASSES

For the purpose of this work scope, there will be three classes of imminent threat. Class 1 will be the most threatening. Class 3 will be the least threatening.

Class 1 Imminent Threat

Any imminent threat or threats capable of causing or potentially likely to cause:

1. death or severe injury;
2. loss of containment of oil or its by-products in excess of requirements;
3. loss of design safety margin to a level below normal operating conditions; or
4. complete indeterminacy of design safety margin.

Class 2 Imminent Threat

Any imminent threat or threats capable of causing or potentially likely to cause:

1. severe injury or loss-of-time injury;
2. loss of containment of oil or its by-products approaching maximum allowed by requirements;
3. loss of design safety margin to a level below approved design and above normal operating conditions; or
4. indeterminacy of design safety margin for select parts or components of containment systems or systems important to containment.

Class 3 Imminent Threat

Any imminent threat or threats capable of causing or potentially likely to cause:

1. loss-of-time injury;
2. loss of containment of oil or its by-products; or
3. indeterminacy of design safety margin for select parts or components of systems important to containment.

The QTC audit team is composed of audit and evaluation experts representing several disciplines not only from an engineering competence standpoint, but also with management process and program talent. The team is made up of:

Owen L. Thero - Team Leader
Ralph O. Williams - Senior Electrical Engineer
Hugh McMenamin - Senior Mechanical Engineer
Dr. Herb Schroeder - Senior Civil Structural Engineer
Charles C. Hill - Senior Project QA Engineer
Lawrence E. Hamner - Senior Project Analyst
Juanita Ellis - Project Specialist and Data Coordinator

The combination of this team of experts with QTC's proposed methodology was designed to assure a proper evaluation of the implementation of engineering aspects as well as the

correlation of such engineering aspects to standard quality assurance activities.

Three members of the Bureau of Land Management/Quality Technology Company (BLM/QTC) on-site audit team (Owen Thero, Bill Hamner, Chip Hill) arrived in Anchorage, Alaska, on Sunday, August 29, 1993. The remaining members of the on-site audit team from the lower 48 states (Ralph Williams, Hugh McMenamin) arrived in Anchorage on Tuesday, August 31, 1993. Dr. Herb Schroeder, the sixth member of the on-site team, is a resident of the Anchorage area and was already on location to support the audit process.

On Monday, August 30, 1993, the members of the BLM/QTC on-site audit team (hereinafter referred to as the audit team) obtained the required office equipment and established their office in the area provided by the BLM located in room A-35 of the Federal Building Annex, 222 West Eighth Avenue, Anchorage. In order to better control access to QTC's phone records, four commercial private lines were installed (in addition to the government phone lines) with the phone bills programed to be directly forwarded to QTC in Kansas.

The support afforded the audit team from the BLM's Joint Pipeline Office (JPO) and the audit team's on-site BLM interface throughout the audit process was excellent.

The audit started on Tuesday, August 31, 1993, with a visit to the Alyeska Quality Assurance (QA) headquarters to review documentation and to interview the QA Supervisor and a senior QA auditor. The manager of Quality Services was also interviewed, as well as an Alyeska Senior Advisor and the Manager, Pipeline Quality and Compliance.

On Wednesday, September 1, 1993, the BLM/QTC audit team was introduced by the Contract Officer's Representative (COR) and the Project Inspector (PI) (the local BLM point of contact for the audit team) to key members of the JPO. Following the meeting with the JPO, two introductory meetings with the audit team and Alyeska senior management and middle management were conducted.

The Alyeska President committed to complete support, cooperation, access, and openness to the audit team throughout the audit process. The expectations of the President were conveyed throughout the Alyeska organization, and from the audit team's perspective, all his expectations were certainly met.

The audit team interviewed or had contact with two hundred forty-seven (247) TAPS personnel. Alyeska provided fifty-five (55) document transmittals which forwarded one thousand four hundred eighty-nine (1,489) TAPS project\related documents for review by the audit team; these were in addition to numerous documents reviewed (but not retained) by the audit team while on-site at the various locations visited. The audit process included: requirements review; documentation review (policies, procedures, instructions, drawings, records); facilities inspection; hardware inspection; and, personnel interviews.

The on-site audit process in Alaska included:

- Anchorage, August 30 through September 5, 1993;
- Pump Station No. 1 (PS-1), September 6 through September 8, 1993;
- Pump Station No. 6 (PS-6), September 9 through September 10, 1993 (helicopter to PS-10);
- Pump Station No. 10 (PS-10), September 10 through September 12, 1993;
- Valdez Marine Terminal, September 13 through September 19, 1993; and,
- Anchorage, September 20 through October 10, 1993.

The responsiveness of Alyeska personnel in meeting the requests of the audit team for documents was a massive and disciplined effort. This high level of effort by key Alyeska personnel continued even after the audit team left Anchorage on Sunday, October 10, 1993, to compile its report in Texas.

Phone interviews/contact with Alyeska personnel and document transmittals continued between Anchorage and Dallas until the eleventh hour of issuing this final report.

It was a goal of the audit team that the expected openness of the audit process be a two-way path. The audit team went to great lengths to assure that there were no secret agendas or hidden results by the audit team and that this final report would not represent any surprises. This awareness by Alyeska personnel at all levels was made clearer by the unexpected total numbers of personnel interviews that the audit team found it necessary to conduct. This time-consuming activity by all members of the audit team slowed the audit process and created an additional burden for Alyeska in accomplishing their necessary daily work activities.

This interview process was mandatory in order for the audit team to fully understand the work control processes being implemented by Alyeska in operating and maintaining the TAPS.

The audit team, early in the process, discovered that the QA program that was allowed to be in place and to control the process and program aspects of the TAPS, was dysfunctional and incapable of assuring that the TAPS had been constructed and could be maintained and operated efficiently and safely in a manner such that the health and safety of the public, and the environment/ecosystem could be assured. This failure by Alyeska and its owners to require a total management approach to quality was exhibited by the lack of documented and specific expectations as to specific job responsibilities via position descriptions, implementing procedures and instructions.

The achievements of Alyeska since operation of this strategic project began in 1977 have been, to a very large extent, the result of many dedicated, knowledgeable, and self-sacrificing employees and contractors. The required efforts by these TAPS personnel, including those dubbed as "whistleblowers," came about because of the lack of project management's understanding and dedication to guidance through disciplined process and programs, which is mandated by an effective and integrated QA programmatic approach.

FINAL REPORT OF AUDIT ON BEHALF OF BLM
OF THE TRANS-ALASKA PIPELINE SYSTEM (TAPS)
BY QUALITY TECHNOLOGY COMPANY (QTC)
November 5, 1993

AUDIT TEAM HIGHLIGHTS

Alyeska Pipeline Service Company (APSC) has had the general good fortune to move extremely large quantities of oil in the past without creating lasting environmental problems. This is because many front-line personnel care about their jobs, are very knowledgeable and proficient in their jobs, and are willing to sacrifice. Many have had a long association with the pipeline and on-the-job experience (since the beginning of construction). The moving of such large quantitites of oil is not, however, because of the efforts of mid-level management; to the contrary, collectively mid-level management has failed to recognize regulatory requirements, to strategically plan how to meet those requirements, to develop the working-level procedures on how to implement those requirements and plans, to provide the equipment and resources to carry out those procedures, to adequately train personnel on how to carry out those procedures, to provide the oversight necessary to assure compliance to those procedures and training, and generally to support the workers in carrying out their work and in the resolution of their concerns. Upper management in the past has not only failed to prevent or correct these mid-level management failures, but also has failed even to recognize the need to do so. Upper management has demonstrated a tolerance for negative practices such as harassment and intimidation of quality control inspectors and others, and has failed to take affirmative actions needed to establish the integrity of the operation.

There are many substantial lapses or absences in systems and programs that should support pipeline operations. The resultant risks can be serious or even catastrophic. In many cases, so little is in place in terms of systems, programs, and accompanying data that the risks are indeterminate -- no one really knows how severe the effects of such lack of control could be. The concerns of the audit team were increased because there are serious deficiencies both in the status of the hardware and in quality assurance and quality control program and inspection areas. For example:

- Equipment necessary for safe operation and shutdown of the pipeline may fail during not-uncommon earthquake/seismic events. This is of serious concern to all members of the audit team, and applied to at least the following specific areas:
    - cable tray supports
    - cables
    - power distribution centers
    - non-mainline pipe supports
    - mainline pipe in direct contact with vertical support members

For example: As presently installed, during an earthquake/ seismic event, the cable tray supports could fail, cables could fall, tear loose from their connections, whip around, damage other sensitive equipment, cause fires, kill or injure operations personnel, and cause complete loss of control of an entire station or even the entire pipeline. This could cause entire sections of the pipe to fail to contain the oil, creating massive damage or degradation to the environment, wildlife, personal property, and even loss of life. This condition would be worse if it occurred at the Valdez Marine Terminal, which has the potential for the most severe earthquake occurrence in the pipeline system.

The potential for disaster is increased by the fact that many cable trays are severely overloaded, thereby increasing the possibility that damage could occur during a seismic event and that the damage could be more severe. This also calls into further question the ability of the electrical system, which controls everything, to survive and function as required.

- Massive violations of the National Electric Code (NEC) exist, many of which have not previously been recognized as problems.
- There is no program for inspecting or testing the integrity of mainline pipe girth welds.
- The pipe is in direct contact with the vertical support members (VSM) in hundreds of places, presenting a potential for breaching containment under earthquake/seismic conditions.
- Quality assurance and quality control (QA/QC) programs do not function as required and therefore cannot assure that the design, maintenance, and operation are being carried out as intended.
- The safety margins of essential systems have not been maintained and their status is indeterminate at best.
- There is no adequate method in place (such as a "lessons learned" program) to learn from past experiences/problems.

There are serious deficiencies in programs related to:
- equipment and professional standards and criteria
- inspection
- testing and calibration of equipment
- maintenance, preventive maintenance, and tracking
- recordkeeping, drawings, and documentation
- fire control
- a seismic event control program
- electrical and control hardware
- pipe girth welds
- pipe abutting the vertical support members (VSM)
- corrective action
- emission monitoring
- work control
- procurement

For example, there is no meaningful inspection program and no way of knowing what inspection results mean. There is either no criteria or checklists to govern and guide inspections, or those existing are often inadequate. Individual inspectors are relying on their professional knowledge and what they happen to see to identify problems. There is often no systematic approach to the inspections. Different inspectors produce different results and identify different problems, catching some and missing others. Established industry standards such as the National Electric Code are not routinely followed.

The recordkeeping system is inadequate. Retrievability of records is poor. There is no system to assure follow-through and closeout of deficiencies to prevent problems from occurring and continuing to happen. Project work packages were falsified intentionally. Some inspectors are questionably certified, as are other professionals except by minimal state standards for crafts. The inspection function is not independent. Documentation of all types, including identification tags on equipment and as-built drawings, is non-existent, missing, incomplete, or inaccurate, including documentation and drawings that might be needed in an emergency.

There is no requirements matrix that would allow APSC to know all the regulatory and other compliance standards they are required to meet. There are no master equipment lists that allow APSC to know what they have to work with. Individual knowledge, which varies widely, is relied on. There is inadequate staffing, especially in the electrical area. Training often is minimal.

The deficient programs included above that do not directly relate to hardware are as critical to the safe operation of the TAPS as are the defined hardware deficiencies. The lack of these programs makes the safety of the hardware indeterminate and means that no one knows when a problem will surface, the magnitude of the problem, or its effect on the public health and safety. It also means that the regulatory requirements placed on APSC are not met, which can be as dangerous as, or more dangerous than, the obvious hardware deficient conditions described.

The attached allegation matrix is a compilation of findings by the audit team regarding the subjects identified as to whether those concerns as understood by the audit team were substantiated or unsubstantiated during the BLM/QTC audit. The subjects of the allegations are discussed in more detail in the audit report. Of the total 37 allegations, 19 were substantiated and 18 were unsubstantiated.

No.	Class Category	Allegation	Substantiated	Unsubstantiated
1	N/A	Corrosion/Integrity		✓
2	Class 2	Girth Weld/Integrity	✓	
3	Class 3	Leak Detection	✓	
4	N/A	Oil Spill Prevention Plan		✓
5	N/A	Training for Oil Spill Response		✓
6	Class 1	Earthquake Program	✓	
7	Class 1	VSM	✓	
8	Class 1	Electric Program	✓	
9	Class 1	Monitoring/Surveillence	✓	
10	N/A	Glaicial Surge		✓
11	N/A	Slope Stability		✓
12	N/A	River Erosion		✓
13	N/A	Increased NGL caused Vent/Relief Problem		✓
14	Class 2	No Monitoring of H_2S NOX & Benzene C.T.U. Plume	✓	
15	N/A	Non Penetration weld Fire System V.M.T.		✓
16	N/A	V.M.T. Fire/Foam System down for 3 years		✓
17	N/A	Uncertified Materials/Atigun	✓	
18	Class 1	Monitoring & Oversight • Pipeline Systems • Documents • Follow-up, Training	✓	
19	Class 1	Non-Compliance with QA-36	✓	
20	Class 1	Failure to implement Rev. 5 & 7 of QA-36	✓	
21	N/A	PS 6 Air quality affecting Stevens Village		✓
22	N/A	PS 6 Drinking/Well affecting Stevens Village Heavy Metal		✓
23	N/A	Unauthorized Project Supervisors		✓
24	Class 1	Electrical Code Violations	✓	
25	Class 1	Violations of State Elctrical Laws	✓	
26	N/A	False Quality Control Inspection Reports		✓
27	N/A	Ballast H_2O Treatment, Started Building before Inspection Checklist	✓	
28	N/A	PS 6 Heat Exchanger not Inspected since 82		✓
29	N/A	Air Stripper Motors labeling problem		✓

No.	Class Category	Allegation	Substantiated	Unsubstantiated
30	N/A	Uncertified Electrical Technicians	✓	
31	N/A	Illegal use of Drugs & Alcohol		✓
32	N/A	Falsified Project Work Package Files	✓	
33	Class 2	Absenc of Adequate Monitoring for Gas Emissions	✓	
34	N/A	Resistance values for Insulating Flanges, Loading Arms V.M.T.		✓
35	N/A	Various RGV, Command/Uncommand Valve Shutdowns due to failures		✓
36	Class 1	V.M.T. Cable Trays tangled/improper mix	✓	
37	N/A	Improper use of surge tanks for refining feed stock	✓	

FINAL REPORT OF AUDIT ON BEHALF OF BLM OF THE TRANS-ALASKA PIPELINE SYSTEM (TAPS) BY QUALITY TECHNOLOGY COMPANY (QTC)

November 5, 1993

EXECUTIVE SUMMARY

This executive summary contains a brief description of the findings of the BLM/QTC audit team (hereinafter referred to as the audit team) identified during its review and evaluation of the Trans-Alaska Pipeline Service (TAPS) operated and maintained by the Alyeska Pipeline Service Company (hereinafter referred to as Alyeska).

Included in this review are several "strengths" which are especially noteworthy, as well as the areas evaluated by the members of the audit team as being deficient conditions, either in process and program, or in hardware that represents an imminent threat to the health and safety of the public, defined as:

> Imminent Threat: An imminent threat is a deficiency or combination of deficiencies in or across design, construction, maintenance, operations, program, or management, such that were it to remain uncorrected, could adversely affect the safe operation of the project.
>
> Safe operation means operation of sufficient manner and quality to assure the protection of health, safety, and environment.

IMMINENT THREAT CLASSES

For the purpose of this work scope, there will be three classes of imminent threat. Class 1 will be the most threatening. Class 3 will be the least threatening.

Class 1 Imminent Threat

Any imminent threat or threats capable of causing or potentially likely to cause:

1. death or severe injury;
2. loss of containment of oil or its by-products in excess of requirements;
3. loss of design safety margin to a level below normal operating conditions; or
4. complete indeterminacy of design safety margin.

Class 2 Imminent Threat

Any imminent threat or threats capable of causing or potentially likely to cause:

1. severe injury or loss-of-time injury;
2. loss of containment of oil or its by-products approaching maximum allowed by requirements;
3. loss of design safety margin to a level below approved design and above normal operating conditions; or
4. indeterminacy of design safety margin for select parts or components of containment systems or systems important to containment.

Class 3 Imminent Threat

Any imminent threat or threats capable of causing or potentially likely to cause:

1. loss-of-time injury;
2. loss of containment of oil or its by-products; or
3. indeterminacy of design safety margin for select parts or components of systems important to containment.

The audit team is also separating the "Alleged TAPS problems [sic] areas" included by the Bureau of Land Management (BLM) that were investigated by the audit team into two (2) categories:

1. whether the alleged problem was determined to be valid (substantiated) as stated; or,
2. whether the alleged problem was determined to be not valid (unsubstantiated[1]) as stated.

Additionally, the audit team has received allegations that, due to their nature and the time required to investigate, have not been investigated by the audit team.

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[1] It should also be noted that an "unsubstantiated" categorization should not be interpreted to mean that the allegation was untrue; although it may be that the information available to the audit team indicated that the alleged problem was not valid, it also may be that there was a lack of available information sufficient to prove that it was valid.

STRENGTHS

It was especially striking to the audit team that most of the strengths discussed in this section are, in effect, due to the weaknesses of the organizational structure and management's approach to process control and program definition. Although the audit team found the strengths to be laudable and essential to the health and safety of the public, it should not have been necessary in a properly structured and managed organization for individuals to develop self-initiated programs in an attempt to overcome programmatic weaknesses.

1. The most important strength of all which has resulted in Alyeska's ability to reach the levels of oil through-put of over 9 billion barrels of oil since operation began is in a very large part due to the talent, experience, and dedication of the work force manning the pump stations and the Valdez Marine Terminal.

   Although similar personnel strengths were also identified in the headquarters activities in Anchorage, the strengths were more isolated and were less integrated from a teamwork approach. In some instances, there was a lone individual in an organization who was carrying the load for what should have been a programmatic approach to the work activities.

2. The audit team has recognized a major Alyeska strength regarding a "grass roots" ad-hoc team approach to positive creative problem-solving. The audit team, in performing their audit at Pump Station Nos. 1, 6, and 10 had the opportunity to closely work with the personnel at those locations. This close interface was relatively short in duration, but was intense, and provided a better opportunity for open communication and understanding.

   Reportedly, the methods utilized by the audit provided insight and reinforced understanding of the station personnel as to process and program responsibilities and their effect on the integrity and reliability of hardware.

   As a result of the audit, the on-site leadership of the three (3) pump stations encompassing the three (3) districts, including Pump Station Nos. 1 through 12, have formed an ad-hoc team whereby the audit team's scope, methodology, and general findings are being integrated to:

   - compile audit notes;
   - identify areas that can be quickly resolved;
   - categorize issues (e.g., whether systemic, site-specific);

- develop comprehensive work orders, project work packages, etc.;
- identify symptoms and perform root cause analysis; - schedule activities; and
- make recommendations on issues that may be controversial due to cost, organizational impact, etc.

The audit team is very encouraged by the activities of this select but integrated activity and considers it a strength.

3. The audit team identified the following strength pertaining to maintenance at Pump Station No. 1:
A maintenance supervisor recognized the need to enhance the retrievability of data concerning preventive maintenance (PM) required for each item included in the Pump Station No. 1 PM program. The supervisor also recognized the need to collect the kind of data from each PM/Work Order that would lead to the development of an effective predictive maintenance program. The supervisor has initiated a program which, although in its infancy, accumulates and places in one location by equipment tag number all pertinent data affecting that item. This accumulation of data includes but is not limited to previous maintenance records, vendor manuals, and technical bulletins. The ingenuity and organizational skills

displayed by this supervisor in the development of a much-needed program was considered by the audit team to be a strength.

4. The audit team identified the following strength pertaining to maintenance at the Valdez Terminal, Ship Escort Response Vessel System (SERVS):
The maintenance of the SERVS equipment through the application of a very strong and pro-active safety program is a strength. The implementation of the Alyeska SERVS safety inspection and therefore an enhanced maintenance program, under the direction of the Safety/IH Field Specialist, SERVS, has not only focussed on personnel safety but on the ability of the various ships and supporting equipment to sustain the tanker movement of oil in a safer manner.

5. An additional strength identified by the audit team was the program controlled and tracked by the COMAC computerized maintenance management work order system, which extends to all facets of the SERVS project, including escort/emergency/response towing equipment, and vessels.

6. Another SERVS strength involves conducting dynamic tanker assist exercises and the Prince William Sound Disabled Tanker

Study to evaluate the capability of existing emergency towing vessels and outfit at Prince William Sound and to examine alternatives that could enhance the escort and assist capabilities for disabled tankers.

7. The audit team identified the following strength pertaining to as-built drawings:

The more complex the system configuration, the more important the role of as-built drawings. Some of the most complex systems are in the area of instrumentation and control. The Audit Team noted a strength during its inspection of the Instrument/Metering Department (I/MD) at the Valdez Marine Terminal (VMT) regarding the development of as-built drawings. The I/MD technicians took it upon themselves to develop a computer-aided drawing capability to compensate for the lack of correct as-built drawings for the electrical systems which they are responsible to maintain. The department developed the process to initiate the drawings they require to perform their daily work tasks. The technicians manually tracked wires and developed computerized as-built wire lists that correctly define the as-built condition of the hardware (e.g., for the Ballast Water System), even though the software is not user-friendly. The audit team noted that the technicians did not have software training available and spent several hours

learning the software to develop the drawings required. It was also noted by the audit team that this knowledge is retained by a few select individuals and there is concern among the technicians that impending layoffs, transfers, or early retirements will affect their abilities to continue this level of effort which will ultimately affect the safety of the facility.

8. The audit team identified the following strength pertaining to stocking of material:
Stock material, spare parts, and spares located at the pump station mini-warehouses are bar-coded as a part of the receiving process. During this process, the material handler applies a bar-coded label directly to the part/material or, in the case of very small parts, to the box or container in which they are packaged. This process allows real-time analysis of usage levels which plays a large role in establishing and adjusting ordering/stocking criteria to assure that appropriate spare parts for critical systems are on hand when needed.

9. The audit team reviewed the progress being made by Alyeska in meeting the regulatory requirements governing the control

of highly hazardous chemicals through implementation of the process safety management (PSM) program.

The audit team, in its assessment of the progress made to date of this program, has determined this effort to be a strength. The development of logic flow diagrams and training programs, modules, and methodology by the training department is outstanding. Although all facets of the PSM program have not been fully developed and implemented, the audit team is encouraged by this program's apparent total commitment to quality. During the audit team's interview with members of Alyeska management, there was considerable discussion that Alyeska may be contemplating expanding the scope of the PSM program into additional TAPS activities.

10. It should be noted that the audit team was extremely impressed with the understanding and desires of the OMOS operations support document control supervisor to develop and maintain systems and controls to keep the various TAPS operating facilities informed with the most up-to-date information available which they require in order to maintain safe maintenance and operation. The audit team considers this effort to be a strength.

CLASS 1 IMMINENT THREATS

Imminent Threat: An imminent threat is a deficiency or combination of deficiencies in or across design, construction, maintenance, operations, program, or management, such that were it to remain uncorrected, could adversely affect the safe operation of the project. Safe operation means operation of sufficient manner and quality to assure the protection of health, safety, and environment.

Class 1 Imminent Threat

Any imminent threat or threats capable of causing or potentially likely to cause:

1. death or severe injury;
2. loss of containment of oil or its by-products in excess of requirements;
3. loss of design safety margin to a level below normal operating conditions; or
4. complete indeterminacy of design safety margin.

1. Mindset

The audit team views the underlying philosophy and mindset of Alyeska management as the greatest non-hardware-related imminent threat. The relative history of safe operation of the TAPS emanates from the extraordinary experience, talent, and dedication of many select Alyeska employees and contract

personnel. However, the safe operation of the TAPS is not based on "prevention" through process control, adequate programs, procedures, instructions, and drawings as should be expected and demanded in a project of the magnitude of the TAPS. This approach does not fulfill the regulatory responsibility Alyeska and the TAPS project have to safeguard the country's interest in this strategic project. Neither does it fulfill the responsibility to minimize the potential adverse effect it can have on the health and safety of the public, and the environment/ecosystem.

The TAPS hardware is aging and the through-put is declining. Alyeska is on a path to reduce expenditures (e.g., contemplated layoffs, offering early outs to long-service employees) in order to compensate for the loss of oil revenues/profits. Upper management's mindset is such that, because of a basically sound design and construction effort and normal operating conditions (e.g., not having to deal with earthquakes, fires, etc.), prevention is not a priority of upper management and consequently is not a priority of middle management or for the majority of the workers. The audit team is very much concerned at the lack of prevention through strategic planning, adequate procedures, and

compliance with regulatory requirements, brought about by development and implementation of an effective quality assurance program.

As previously mentioned, prevention is not the management philosophy; rather, reaction to problems as they arise forms the framework of the operating philosophy. The audit team finds this approach and philosophy dangerous, particularly when personnel do not have the required support provided by solid programs, adequate training, procedural controls, instructions, and drawings. Therefore, this condition is a Class 1 imminent threat.

As discussed in the following, there also exist many significant and potentially severe problems with design and design control, quality assurance, and inspection. These, in combination, are sufficient in the assessment of the audit team, to rise to the level of a Class 1 imminent threat. And in further combination with the mindset of management discussed above, they call the design, implementation of that design, and the safe operation and control of the entire pipeline into serious question.

Threat Discussion. A brief discussion of how apparent non-hardware issues can lead to hardware failures is in order since it will recur throughout this report. In a system with few redundancies (both hardware and software), it is generally only a matter of time until some relatively benign accident sequence expands into a catastrophic event. A prevention-oriented management has solid process control programs, backed by procedures, instructions, and drawings. These are aimed at and successful in mitigating most benign accident sequences and deficiencies prior to their causing an accident. They are almost 100% successful in preventing benign accidents from expanding. As observed in this section, this preventative mode is not the case at Alyeska.

As an example illustrating this sequence, suppose electrical control cabinets are used for temporary storage of metal rods (a condition found at Alyeska). Suppose an employee is working in the cabinet, bumps the rod, and shorts out the panel. Suppose the panel were controlling a safety process and when it is shorted out the control is lost. Finally, assume that loss of control leads to overpressurization of a system and an explosion. The explosion results in severe personnel injury. This accident chain starts with a

deficient programmatic condition (rods in cabinet) that should never have been allowed to occur.

While this one accident chain, rods lead to explosion, is not very likely, the more such starting points (deficient conditions, programmatic or otherwise) that exist, the more likely it becomes that a catastrophic event will occur. Interactive preventative programs, procedures, instructions, and drawings, reduce or nearly eliminate these accident starting points. When these programs are weak or absent, the number of accident starting points increases dramatically. This increases the likelihood of a serious accident. Alternately, it satisfies the definition of imminent threat.

2. Regulatory Requirements Matrix

To date, Alyeska has not incorporated into their quality assurance program the compilation of regulatory requirements mandated by the TAPS agreement and other commitments. The audit team was unable to verify that the regulatory requirements/commitments were accounted for, understood, and incorporated into the functional organizations' implementing procedures. The failure of the functional managers (whose responsibility it is) to define applicable regulatory requirements and where those requirements are addressed in

their implementing procedures and instructions leaves the status of the TAPS indeterminate. Therefore, there is no assurance that regulatory requirements are being properly managed as they apply to the health and safety of the public and environment/ecosystem. This constitutes a Class 1 imminent threat in the assessment of the audit team, since failure to implement regulatory requirements could result in any number of injurious conditions.

3. Design Control

The Alyeska design control process does not interface with, nor is it an integral part of the Alyeska QA program. Design control is a very key element of a functioning, disciplined, and effective quality assurance program. One of the most pressing concerns of the audit team is the ability of key systems to function as designed during a seismic event. The seismic design control process, and its incorporation into as-built configuration of the hardware, constitute one facet of a QA program's ability to maintain the safety margin of critical equipment (e.g., electrical systems, cable trays, cables, pipe supports). Once the TAPS became operational, this process broke down, in the assessment of the audit team, and as a result the integrity and safety margin of the TAPS is indeterminate. This loss of design control as part of the

QA program is therefore considered to be a Class 1 imminent threat.

Threat Discussion. As an example, loss of design control has led to cable trays apparently not meeting seismic requirements. In a design basis earthquake, the trays would likely change orientation or fall. In either case, this would likely cause cables to pull loose from their connections or break. This would disable electric circuits and cause loss of power and the consequent inability to control systems. This would likely result in personnel injury and loss of oil containment.

4. Electrical Systems Integrity

The greatest hardware threats to the health and safety of the public and environment/ecosystem identified by the audit team relate to the electrical systems. The present National Electric Code (NEC) inspection and correction program being conducted at the Valdez Terminal (the NEC Compliance Project) lacks sufficient criteria, breadth, and scope to assure that all NEC violations are being identified and will be adequately resolved.

The areas identified by the NEC inspection activity presently underway at Valdez Terminal, including other deficient conditions identified by the audit team, have also been identified by the audit team at Pump Station Nos. 1, 6, and 10. Similar imminent threat conditions exist at all of the other pump stations. There is presently no program in process for adequate NEC inspection and correction activities to take place at the pump stations.

The audit team considers the capability of cable tray supports, and therefore of the cables, to withstand seismic/ earthquake conditions to be indeterminate and to be a Class 1 imminent threat. This threat is exacerbated by another current imminent threat which exists due to the fact that many safety system cable trays are overfilled and overloaded. Therefore, the electrical violations to regulatory requirements and the loss of seismic integrity constitute a Class 1 imminent threat.

Threat Discussion. Refer to the discussion on design control for an example of the potential outcome of failure of electrical systems.

5. Quality Assurance

The quality assurance program as developed and maintained by Alyeska has been and remains dysfunctional. Not only has the program as described in the various quality assurance manuals been inadequate from a total approach to quality, but the manuals as defined have not been implemented with the exception of selected audits and surveillances.

From approximately 1980 to 1990, the quality assurance program was woefully understaffed. At this time, the quality assurance staffing consists of a total of eight persons, including the manager and his secretary, with two auditors performing one audit per month over the past two years. The QA manager, for the past four months and currently, reports to the Vice President of Administration, who has had no prior experience in any phase of a quality assurance program. To date, although required by the quality assurance program manual, no corrective action requests (CAR's) or stop work authorization documents have been allowed to be initiated, although significant breakdowns in the quality assurance program have been recognized by the Alyeska QA organization.

Cause and corrective action programs, including root cause analysis and trending, are not a part of the quality

assurance program as presently implemented; therefore, conditions adverse to quality are not being analyzed on a programmatic basis to prevent recurrence, with the exception of major issues such as the pig run at Thompson Pass. There is no formal lessons learned program. Due to the fact that these significant and basic programmatic approaches to quality are non-existent, major components, systems, and structures relied upon to protect the health and safety of the public and environment/ecosystem remain indeterminate. The quality assurance program lacks the breadth, depth, scope, and organizational freedom to protect the health and safety of the public.

The functional organizations are generally in non-compliance with the QA Manual in that all lack coordinated implementing procedures and many totally lack implementing procedures vital to the ability to protect the health and safety of the public. The lack of an effective and integral QA program in the operation and maintenance of the TAPS represents a Class 1 imminent threat.

Threat Discussion. The Quality Assurance program is designed to prevent deficiencies from occurring, find deficiencies if they exist, and assist in fixing them so that they do not

occur again. This is not the case at Alyeska. The result is that a greatly increased number of deficiencies are allowed to exist. These can serve as the starting points to accident chains discussed in the section on Mindset, and that is why a deficient QA program is an imminent threat.

6. Vertical Support Members (VSM's)

An aerial surveillance was conducted which noted that the pipeline was in contact with the vertical support members (VSM's) at dozens of locations. This observed condition violates the design free space required between the VSM and the support saddle which provides for relative lateral motion of the pipe/VSM system during a seismic event.

Alyeska has reportedly observed 421 such contact points along the right-of-way. Each contact point is evaluated and the decision on whether to realign the pipe is made based on a number of variables including the seismic zone. The basis of the decision is "engineering judgement." "Engineering judgement" is not defined or clear. The integrity of the pipeline is indeterminate and therefore this condition of the pipeline as it currently exists poses a Class 1 imminent threat to the health and safety of the public, and the environment/ecosystem.

Threat Discussion. The lack of design free space greatly increases the likelihood of a mainline pipe failure during a design basis earthquake. This would likely result in spilling thousands of barrels of oil and illustrates why this condition is an imminent threat.

Class 2 Imminent Threats

Class 2 Imminent Threat is defined as:

Any imminent threat or threats capable of causing or potentially likely to cause:

1. severe injury or loss-of-time injury;
2. loss of containment of oil or its by-products approaching maximum allowed by requirements;
3. loss of design safety margin to a level below approved design and above normal operating conditions; or
4. indeterminacy of design safety margin for select parts or components of containment systems or systems important to containment.

1. Mainline Piping Systems Girth Welds

Alyeska has not implemented a girth weld monitoring program equivalent to the mainline piping corrosion/deformation monitoring program. No data has been accumulated or provided on the integrity of the girth welds when individual pipe sections or segments have been removed due to activities such as the Atigun Pass pipe relocation project. The girth welds have basically been uninspected since the original installation conducted in the early 1970's.

This lack of an adequate quality assurance/quality control program, including nondestructive examination, leaves the integrity of several thousand girth welds indeterminate, and constitutes a Class 2 imminent threat.

Threat Discussion. The integrity of the girth welds is unknown. Alyeska supposes they are adequate but has no physical data to support this conclusion. Girth weld failure would likely result in loss or spillage of thousands of barrels of oil.

2. As-Built Drawing Control

Up-to-date as-built drawings encompassing the pump stations visited and the Valdez Terminal do not exist. This is especially noteworthy for the electrical and instrumentation and control systems being maintained at these facilities.

Therefore, the as-built, as-maintained, and as-operated configurations of the pipeline safety systems remain indeterminate, and represents a Class 2 imminent threat.

Threat Discussion. Accurate configurations are required for design modifications, trouble-shooting, and to otherwise work safely on the systems. As an example, suppose a technician

is going to work in an electrical cabinet. The drawing is pulled to see what switch to throw to depower the cabinet. The switch is thrown, the cabinet opened, and the technician is severely shocked. The drawing was wrong. (The audit team received verbal reports similar to this.)

3. Quality Control -- General and Nondestructive Examination Inspection

Arctic Slope Inspection Services (ASIS)

Alyeska, on the recommendations of Quality Services Department, expanded the inspection function of ASIS to include general inspections (mechanical, welding, coating, receipt and supplier, electrical, and civil). ASIS was at that time and remains in noncompliance with the contract in that it does not have a quality assurance/quality control program for general inspections.

Neither of the two documents to which ASIS is working contain the inspection program or criteria for performing electrical inspections, for which ASIS is responsible.

Neither has ASIS verified that the State certifications for electrical inspectors meet specific inspection needs for the TAPS project. This fact of potentially unqualified State-certified electrical inspection personnel coupled with the

lack of specific electrical inspection criteria leaves the status and integrity of electrical equipment and components indeterminate.

Precision measuring equipment is improperly protected from damage during shipment to and from the out-of-state vendors performing calibration functions. This leaves the status and integrity of the systems, structures, and components utilizing calibrated NDE equipment indeterminate.

The following conditions were identified by the audit team during inspection of the precision measuring and test equipment (PM&TE) storage facility and the warehouse maintained by ASIS:

- the loss of humidity and temperature control
- the loss of access control
- unidentified discrepant and out-of-calibration PM&TE comingled with accepted equipment
- unapproved shipping containers used to ship and receive back PM&TE from out-of-state calibration facilities
- the lack of engineering-approved shipping instructions

- unapproved hazardous work activities of a personal nature taking place in the warehouse
- unapproved storage of corrosives and flammable products intermixed with PM&TE and records
- Alyeska contract material intermixed with other contract material
- equipment improperly stored and maintained

The loss of control of a most critical function such as inspection services by Alyeska represents a Class 2 imminent threat.

Threat Discussion. The inspection function assures that components important to safety are installed and operated in accordance with design. To the extent that this function is defective, the more likely it becomes that the design is violated. That is to say, the more likely there are to be deficiencies capable of initiating accident sequences such as discussed in the section on Mindset.

4. <u>Quality Services Department (Alyeska)</u>

Quality Services (QS) does not report to the proper functional management or level which assures independence

from cost and schedule and which provides the required freedom to document conditions adverse to quality.

QS has developed and allows an adjunct inspection process which provides for non-inspectors (e.g., Instrumentation Technicians) to become "inspectors." This is allowed even though they have no previous inspection experience and minimal classroom training.

The audit team collected information indicating that these adjunct inspectors perform their own mandatory inspections and/or perform inspections in disciplines outside their expertise.

The receiving inspection function performed at the various TAPS facilities is inadequate to assure that properly inspected equipment and materials are receipt inspected and released for installation. Receiving inspection procedures are inadequate to assure that items received meet the procurement requirements. Tools and facilities for receiving inspection are also inadequate.

The receiving inspection function was not documented in programmatic form until November, 1992, when the Interim

Material Control Program was issued. In May, 1990 initial Alyeska internal material certification requirements were issued via a memorandum. Prior to the issuance of the

Interim Material Control Program, the status of the receiving function, and hence materials, parts, components, and assemblies was indeterminate. Under this program, several inadequacies remain:.

- Receiving inspection procedures are inadequate to assure that items received meet the procurement requirements.
- Receiving inspection tools and equipment are inadequate.
- The receiving inspection reports are indeterminate.

The audit results and noted deficiencies of the receiving inspection function represent a Class 3 imminent threat since collectively they are capable of causing indeterminacy of design safety margin for parts or components of systems important to containment. When this issue is combined with other issues determined by the audit team to be areas of imminent threat, the overall assessment of the deficiencies concerning Quality Services rises to the level of a Class 2 imminent threat.

Four (4) Alyeska Quality Assurance Audits which were issued between August 31, 1992, and April 21, 1993 (i.e., control of Nonconforming Items, Material Certification, NonDestructive Examination, Arctic Slope Inspection Services) were reviewed. Twenty findings or violations of requirements and twelve observations or recommendations were issued which addressed basic issues of improper management. The basic issues demonstrate that the QS approach to the inspection process is inadequate.

The resultant effect of an inadequate quality control activity leaves the integrity of the TAPS systems, components, and structures indeterminate, and represents a Class 2 imminent threat.

Threat Discussion. The seriousness of the loss of, or defect in, the inspection function was discussed in the previous section. That discussion applies here as well.

5. Fire and Safety Control at the Valdez Terminal

The safety program as implemented by the operations department is inadequate. Inspections are not performed at the frequency identified in the safety requirements manual. The safety inspections are superficial and based on cost and

schedule objectives rather than personnel and equipment safety and its potential effects on the public and the environment/ecosystem. Fire protection equipment/components at the various pump houses are inadequately maintained, resulting in the existence of hazardous conditions which could prevent the ability of the fire systems to adequately respond when called upon. The lack of adequate safety and fire inspections as part of preventive maintenance program and the lack of recognizing equipment in need of maintenance leaves the health and safety of the public at risk, and represents a Class 2 imminent threat.

Threat Discussion. Outcomes here are straightforward. Inadequate maintenance on the fire water system increases the likelihood that it will not respond when needed. Likewise, industrial hygiene or safety is required to, among other things, vigorously monitor a site to assure safe conditions. If this is not done, accidents are more likely to occur.

6. <u>Pipeline Calibration Program (Pump Station Nos. 1, 6, and 10 and the Valdez Terminal)</u>

The non-metering calibration programs being conducted at the pump stations and the Valdez Terminal are inadequate. The calibration facilities themselves are inadequate from the

aspects of: space, organization, storage, segregation of materials, humidity and temperature control. In addition, these facilities demonstrate an extreme lack of care in maintenance and cleanliness. The gauges (secondary standards) used to calibrate pressure instruments are themselves not calibrated. The secondary standards utilized to calibrate permanent plant equipment in the pump stations or the terminal are not identified on the calibration records for the instruments/devices calibrated. There is, therefore, no traceability to the specific secondary standard utilized to calibrate instruments that are essential to safe operation of the equipment. Consequently, there is no way to assess the impact of an out-of-calibration device, nor the extent of any such impact on the safe operation of the facility. Improperly calibrated equipment essential to the operation of the facilities could adversely affect the health and safety of the public, and the environment/ecosystem, and represents a Class 2 imminent threat.

Threat Discussion. A deficient calibration program is similar in result to the deficient inspection function discussed in the section on Quality Control.

7. Emission Monitoring

There is no program that monitors the volume of emissions (hydrogen sulfide, nitrous oxide, and benzene) from bulk storage tanks or from tanker vents at Valdez Marine Terminal. Consequently, the volume of total emissions is unknown. There are, however, adequate monitors and alarm systems in the area surrounding bulk storage tanks, inside buildings, and at other locations where benzene, hydrogen sulfide, and nitrous oxide may potentially be present in confined spaces in sufficient concentration to adversely affect operating personnel. This monitoring alert system, which was reviewed and appeared to be acceptable, applies only to station personnel, not the general public. The lack of a bulk storage tank monitoring program continues to pose an indeterminate but potentially unacceptable Class 2 imminent threat.

8. Document Control

The document control process is fragmented, inefficient and ineffective from a document retrieval and control standpoint, and is not an integral part of the Alyeska QA program. The document control process has completely broken down in assuring that only approved drawings that accurately reflect the as-built configuration of the hardware comprising the TAPS are available at the various user locations (e.g., pump

stations, Valdez Marine Terminal). Further, a master equipment list identifying the structures, systems, and components to be included by the TAPS quality assurance program is not available. The document control function is not part of the overall quality assurance program. This lack of Alyeska's developing and implementing an effective document control function, coupled with the loss of as-built definition, is determined by the audit team to be a Class 2 imminent threat.

Threat Discussion. The potential outcomes of this deficiency follow lines similar to those discussed in Design Control, Quality Assurance, Quality Control, and As-Built Drawing Control.

9. Pipe Supports

The non-mainline pipe supports inspected for compliance to as-built drawings revealed:

- pipe supports are not identified
- as-built drawings did not include specific construction details including configuration or location

- as-built configuration did not appear to have been considered for seismic analysis
- poor weld quality

The lack of adequate as-built drawings for pipe supports to verify compliance to regulatory, engineering, and quality requirements is such that if left uncorrected, could adversely affect the safe operation of the project, particularly in an emergency condition. Therefore, the indeterminacy of the safety margin of pipe supports qualifies as a Class 2 imminent threat.

Threat Discussion. The questionable seismic design and poor weld quality increase the likelihood of supports failing in a design basis earthquake. Failure of the supports would dramatically increase the likelihood of failure of the piping which they support. Piping system failures, depending on the system, could result in loss of major system control to personnel injury.

Class 3 Imminent Threats

Class 3 Imminent Threat is defined as:

Any imminent threat or threats capable of causing or potentially likely to cause:

1. loss-of-time injury;
2. loss of containment of oil or its by-products; or
3. indeterminacy of design safety margin for select parts or components of systems important to containment.

1. Training

Implementation of the training program by Alyeska is in general noncompliance with the Alyeska QA Manual (QA-36, Revision 7). The training department's program to implement the mandatory training program which encompasses regulatory requirements is shallow and lacks the depth to properly assure that all mandatory (regulatory) requirements are understood and implemented by Alyeska personnel. For example, the quality assurance program is a regulatory requirement specified in the TAPS agreement; however, this program is not considered to be a mandatory training requirement.

Contrary to the QA Manual, the Department of Human Resources, which is tasked with the responsibility of ownership of the

training program, views itself as a service organization to assist in training when called upon by other functional organizations. The resulting training of these organizations is disjointed, incomplete, and fails to meet the needs required in order for all persons involved in safety functions to adequately understand and perform as required. A feedback mechanism to the training department resulting from deficient conditions discovered in the field via NCR's, trouble tickets, work orders, etc., does not exist. The staffing of the training department is insufficient to develop and support adequate training modules and to support an adequate training program. Additionally, a program for cause determination of those deficient conditions adverse to quality does not exist. Therefore, the training department has no way to evaluate the effectiveness of the training program or increase training as required.

An effective training element at Alyeska is doubly mandatory since many of the organizations have failed to develop implementing procedures required to direct their efforts and responsibilities.

The training of the functional managers themselves is in question because they have not defined applicable regulatory

requirements and where those requirements are addressed in their implementing procedures and instructions; this lack of definition and procedural compliance leaves the status of the TAPS indeterminate and constitutes an imminent threat in the assessment of the audit team. This lack of an adequate training program presents a Class 3 imminent threat to the health and safety of the public, and the environment/ecosystem.

Threat Discussion. The potential outcomes of this deficiency follow lines similar to those discussed in Design Control, Quality Assurance, Quality Control, and As-Built Drawing Control.

2. Predictive Maintenance

Alyeska has not implemented a comprehensive program to analyze and trend the hardware condition data that results from their preventive and corrective maintenance programs. Neither has Alyeska attempted to develop through a trending program the ability to determine the causes of deficient conditions nor to implement lasting corrective actions to preclude their recurrence. Further, Alyeska is deficient in developing a predictive maintenance program to assure the protection of the health and safety of the public and the

environment/ecosystem, which represents a Class 3 imminent threat.

This deficient condition increases the likelihood of untimely hardware failures. This complicates the accident chain discussed in the Mindset section.

3. Control of Consumables

Alyeska engineering has not developed an approved consumables list (e.g., solvents, chemicals, paints, lubricants) for use on safety-sensitive TAPS equipment at the various user locations. Neither has the Alyeska safety department developed a transient-control-of-hazardous/flammable-materials program. The absence of these essential control programs leaves the integrity of systems, components, and structures indeterminate. This could promote fire and hazardous fumes in areas where those conditions are not expected and could inhibit the ability of fire response teams to properly handle the situation. These conditions place the health and safety of the public, and the environment/ecosystem at risk, and represents a Class 3 imminent threat.

4. Work Control

An organized, disciplined, and documented approach to work control is lacking throughout all user locations. This results in unauthorized modifications to safety equipment (i.e., that equipment which could impact the health and safety of the public and the environment/ecosystem), uncontrolled temporary modifications, inadequate and unauthorized testing, and loss of as-built information and documentation. Additionally, the ability to trend important information resulting from work orders and preventive maintenance activities, which provides basic information in the control of the safety margin of equipment essential to safety, is lost. The work order systems (i.e., Work Orders, Trouble Tickets, POWOR, and MAXIMO) are in use throughout the facilities without authorized implementing procedures. This renders the safety margin of safety components, systems, and structures indeterminate, which constitutes a Class 3 imminent threat.

Threat Discussion. The potential outcomes of this deficiency follow lines similar to those discussed in Design Control, Quality Assurance, Quality Control, and As-Built Drawing Control.

5. Procurement

The procurement process and files for vendor materials and services do not adequately interface with the Alyeska quality assurance program. Purchase orders issued for materials and services in all instances reviewed by the audit team did not adequately include quality and regulatory requirements applicable to Alyeska which would also be requirements for the specific suppliers. A feed-back mechanism into the procurement records does not exist for such items as nonconformance reports, work orders reporting failures of equipment, audits, surveillances, and fitness-for-duty results. Procurement has no way of tracking or trending the ongoing status of materials or services, either for immediate action or future reference. There is no mechanism, therefore, for procurement to properly evaluate performance of either equipment or services from an overall performance perspective. This could adversely affect the health and safety of the public and the environment/ecosystem, and represents a Class 3 imminent threat.

Threat Discussion. If materials required by design are not specified in a manner to assure that they meet design requirements, the likelihood that these materials will fail in service increases. The outcome of such a failure

depends on the significance of the application and the extent to which the goods are defective from a design perspective.

6. Leak detection systems

The detection by means of the metering system is limited in accuracy. The range of detectable direct pipeline spills is from 1500 barrels per day (best case scenario, with very stable operating conditions) to 7000 barrels per day. Spills up to 7000 barrels per day could go undetected unless visually detectable. This potential spill in excess of regulatory requirements represents a Class 3 imminent threat.

7. Nondestructive examination piping integrity programs

The two (2) nondestructive examination (NDE) piping integrity programs conducted by Alyeska include the sonic "smart" pig to gather data about wall thinning and corrosion, and the inertial pig to gather data about buckling or subsidence. Neither of these programs are included in the Alyeska QA program. They are also treated separately from the nondestructive examination (NDE) program administered by Quality Services. The vendor's QA program for controlling the accumulation of and data reduction for these two critical NDE processes have not been reviewed or approved by the QA program. Neither has Alyeska QA audited the services of these two vendors for compliance to contractual obligations.

The indeterminacy resulting from these two programs being conducted outside the Alyeska QA program is considered by the audit team as being a Class 3 imminent threat.

Threat Discussion. The potential outcomes of this deficiency are similar to those discussed in the sections on Quality Assurance and Quality Control.

ALLEGED TAPS PROBLEMS -- BLM LISTING

TECHNICAL:
CORROSION -- substantiated in part

Incidence of corrosion
Corrosion protection and detection system

There is corrosion on the main pipeline and it is being monitored adequately by Alyeska personnel. The corrosion protection and detection system is in place and generally adequate for its function.

The integrity of main pipeline girth welds have not been inspected since construction. The corrosion protection and detection system from the perspective of girth welds was found deficient and hence that portion of the allegation is substantiated.

LEAKS/SPILLS

A. Incidence of leaks/spills -- unsubstantiated[2]

There have been leaks and spills, and Alyeska, at least through the audit team's portion of the review, had detected

[2] As stated previously, it should be noted that the assigning of an "unsubstantiated" categorization should not be interpreted to mean that the allegation was untrue; although it may be that the information available to the audit team indicated that the alleged problem was not valid, it also may be that there was a lack of available information sufficient to prove that it was valid.

them and reported them where required. The allegation, insofar as it applies to undetected leaks and spills, was not substantiated by the audit team.

B. Leak detection system -- substantiated

In regards to the leak detection system, its accuracy ranges from 1500 to 7000 barrels a day. Alyeska is undertaking a program to improve that accuracy by approximately a factor of two (2). Given that they are successful, that would still allow a substantial amount of oil to be lost prior to detection by their primary means. To the extent that that is a problem, this allegation was substantiated by the audit team.

C. Adequacy of oil spill prevention system ("OSCP") planning
and
D. Adequacy of training, staffing, equipment needed for OSCP
-- substantiated in part

The oil spill prevention system planning appeared adequate, as did the training and equipment stocked for spill control. The staffing level currently appears adequate, but there was no indication that planned reductions in staff at Pump Station Nos. 5 and 7 (at a minimum) had been accounted for in the plan. With the exception of the staffing level, this concern was not substantiated by the audit team.

NATURAL HAZARDS

A. **Earthquake/earthquake monitoring** -- substantiated

The audit team is very much concerned regarding the potential effects of earthquakes on the integrity of the TAPS, from several aspects. The concern has been substantiated that the inspected status of critical systems have been designed and installed such that the systems could be jeopardized in their ability to perform their design function during earthquake/seismic events.

The audit team considers this to be a Class 1 imminent threat.

The major systems identified by the audit team as falling into this category are:

Pipeline/Vertical Support Member (VSM) Contact Points

Electrical Systems (cables, cable tray supports, some conduit runs)

Non-mainline pipe supports

Pipeline/Vertical Support Member (VSM) Contact Points -- substantiated

The pipeline is in direct contact with the Vertical Support Members (VSM) at what was estimated to be dozens

of locations. These were not bumper locations. The audit team performed an aerial surveillance of the pipeline by helicopter. During the course of that surveillance, the audit team visually identified the deficient condition that the pipeline would not be able to have lateral movements as the design envisioned within the confines of the vertical support members under earthquake/seismic conditions. Alyeska has reported 421 Pipeline/VSM contact points at the present time. The integrity of the above-ground section of the line during a major earthquake event is indeterminate.

Electrical Systems -- substantiated

The BLM/QTC audit team considers the capability of cable tray supports, and therefore of the cables, to withstand seismic/earthquake conditions to be indeterminate. Many safety system cable trays are overfilled and overloaded. Of additional concern are the threaded rods used to support the cable trays and some conduit runs.

Under seismic conditions, the cable trays and cables could swing and fall, and tear loose their connections. Additionally, the cables that are not tied into the trays, and could be freed from the trays, whip, and

disconnect, do damage to other components and equipment, and if still alive, possibly cause electrical fires.

Monitoring and Surveillance -- substantiated

Alyeska has failed to comply with federal and state stipulations which require the conduct of a documented surveillance and maintenance program appropriate for the harsh arctic environment. The audit team found that the procedures to meet this requirement were inadequate and not followed by Alyeska in the field. The environmental monitoring and surveillance program is not part of an integrated QA program. This lack of programmatic control through an effective QA program is in direct violation of the TAPS Agreement.

B. Glacier surging -- unsubstantiated

The audit team conducted an aerial reconnaissance of the Black Rapids Glacier, reviewed documents, and interviewed Alyeska personnel. During the aerial reconnaissance, the Black Rapids glacier was observed to be approximately four to five miles from the Pipeline. The monitoring and surveillance methods appear to be adequate to detect glacial movement which might pose a danger to the pipeline. The current location of the Black Rapids glacier in relation to

the pipeline will allow, at a minimum, several months in which to mitigate potential risk to the pipeline should a surge event occur. The audit team did not substantiate this allegation.

C. Slope stability -- unsubstantiated

An aerial reconnaissance and a ground assessment of two problematic slopes was performed. The sites were selected for evaluation because of slope stability conditions. Alyeska has realigned the pipe on the crossbeams and adjusted the vertical support members (VSM) located at the Treasure Creek site. Ground monitoring instrumentation has been installed at the site and there is evidence of recent survey activity. The Squirrel Creek site has suffered from chronic settling and lateral movement of the VSM. There were VSM's at the site which were radically "out of plumb." Alyeska has realigned the pipe and extended the VSM's to compensate for this settling. Additionally, thermosyphons have been installed in an attempt to stabilize the subgrade. Subsurface instrumentation has been installed at the site and tabs have been welded on many of the VSM to facilitate accurate survey monitoring.

The field survey indicates that Alyeska's program for monitoring and responding to the slope stabilization problem at both of the evaluated locations is adequate. The pipe is currently properly aligned on the cross beams at these locations, and the situation is being adequately monitored on a regular basis. The audit team did not substantiate this allegation.

D. River erosion -- unsubstantiated

An aerial surveillance was conducted, documents were reviewed, and river erosion problems were investigated at mile post (M.P.) 47 and Moose Creek south of Fairbanks.

The river erosion problem at M.P. 47 appears to be mitigated, as does the much less serious problem at Moose Creek. A review of the Hess Creek documents shows that they appear to be adequate. The audit team's assessment is that Alyeska's response and program regarding river erosion is being satisfactorily evaluated and maintained. The audit team did not substantiate this allegation.

E. Permafrost thaw -- unsubstantiated

The term "permafrost" refers to any soil which remains below 32°F for two years or more. Permafrost had a large impact on

many aspects of the pipeline design. Permafrost has a bearing on each of the two sites visited on the slope stability investigation. Further, all above-ground portions of the pipeline, all animal crossings incorporated in the above ground, and the refrigerated buried sections of the line were originally designed to maintain the permafrost thermal regime, and were found to be adequate by the audit team.

A combination ground and aerial surveillance of the portion of the pipeline which extends south from Prudhoe Bay to Atigun Canyon was conducted by the audit team.

The work pad covering the pipe at both the animal crossing and the transition section contained longitudinal cracks in the area above and along the pipeline (East) edge of the pad. Monitor rods are installed on the pipe at both locations. At other animal crossing locations to the south, monitor rods could be seen from the air. Also, many of these other animal crossings had thermosyphons installed to stabilize the subgrade. Monitor rod data has been collected periodically at the animal crossing since 1980 and at the transition section since 1982. Data indicates that there has been settlement within the range of that which would be expected. The audit team did not substantiate this allegation.

F. Rock bolts -- substantiated

The audit team reviewed Alyeska's draft Trans-Alaska Pipeline Surveillance Procedures and Monitoring Methods dated March 29, 1993, which contained a description of the Valdez Marine Terminal and the key features which are to be observed during routine surveillance. The audit team, however, found that the draft checklist, which includes rockbolt and rockbolted slope surveillance items, lacks definitive and adequate inspection and acceptance criteria.

OIL STORAGE TANKS -- unsubstantiated

A. **Integrity/conformance with standards**

Alyeska is currently responding to a change in the OSHA laws for the State of Alaska, and has implemented an ongoing program to perform internal inspections of all bulk oil storage tanks. They are approximately 30%-40% through completion of this program, which is scheduled for all tanks to be inspected by 1997. Also as a part of the control of oil storage tanks, Alyeska has implemented API and State regulations which require daily, monthly, yearly, and five-year cycle inspections of the outside of their tanks and their tank impoundment facilities.

B. <u>Bulk storage tanks at pump stations and Terminal are classified as "break-away" but not all have been tested internally</u> -- substantiated in part

Although the concern is correctly stated, the tanks are now on a testing schedule accepted by the State to ensure internal inspection at designated intervals.

C. <u>And the absence of adequate monitoring facilities for gas emissions</u> -- substantiated

It was the finding of the audit team that there is no program or capability in place to monitor the volume of emissions from bulk storage tanks. There is also no monitoring of emission volume from tanker vents at Valdez when they are being filled. There are, however, monitors in the area surrounding bulk storage tanks, inside buildings, and other areas where benzene, hydrogen sulfide, and nitrous oxide may be present in confined spaces which could affect operating personnel. Emission of benzene, nitrous oxide and hydrogen sulfide are only monitored for concentration where personnel safety is a consideration.

D. <u>Improper use of surge tanks for refining feed stock</u> -- substantiated

The initial design for surge tanks had their primary use as a reservoir for balancing line flow. When the surge tanks are used to provide refining feed stock, the initial intent of

the design is shifted. The effect of the shift is to provide an opportunity for more vapor emissions than if the tanks were used solely to balance line flow. At present, there is no emissions monitoring system in place to determine emissions for either condition.

VALVES

A. **Resistance valves [sic -- should be values] for insulating flanges for loading arms at Valdez Terminal do not meet specifications** -- unsubstantiated

The current established engineering specifications for resistance values of the loading arms at the Valdez Marine Terminal have been found by the audit team to be conservative and have been incorporated into the Alyeska preventive maintenance test program. The resistance value is effective in limiting the current path between the ship and the loading berth through the loading arm and provides an adequate safety margin for the installation. This allegation is unsubstantiated.

B. **Various (RGV 73, 98, 98A) commanded and uncommanded valve shutdowns due to failures** -- unsubstantiated

Although the subject valves were closed (shut down), they closed because the system worked. The circuitry associated with Remote Gate Valves RGV-73, RGV-98, or RGV-98A was the

source of the shutdown in each case. But in no case did the actual valve act in a commanded or uncommanded method; particularly, there was no uncommanded valve shutdown with respect to the three valves. The valves that were closed were closed as a result of the shutdown program, which had been triggered by circuitry in the three valve stations. This allegation was unsubstantiated.

PRESSURE VESSELS

A. **Noncompliance with State requirements (pressure vessel testing)** and

B. **Failure to test pressure vessels according to State standards** -- substantiated in part

Based upon the inspection reports which the audit team reviewed, there was no evidence that these tests were not in compliance with state standards. There was an indication that the identification of all the pressure vessels were incomplete; consequently, in view of the inability to accurately specify all of their pressure vessels, whether or not they have met state requirements is indeterminate.

ELECTRICAL PROBLEMS

A. **Weeping wires at pump stations and Valdez Terminal - potential fire/safety threat** -- substantiated in part

It is the assessment of the audit team that the "weeping" conditions identified for the electrical cables installed at

the Valdez Marine Terminal and at the pump stations has been substantiated but does not affect the electrical performance or fire safety standards required of the cable as stated by the allegation. Therefore, the safety margin of the cable has not been affected.

B. Cable trays at the Valdez Terminal tangled and having an improper mix of high and low voltage cables -- substantiated

The cables are tangled and do have an improper mix of high and low voltage cables; they do not meet the National Electric Code (NEC) requirements. Consequently, this station and Alyeska are not in compliance with the right-of-way agreements both from the federal and the State governments. This allegation is substantiated.

REFINING ["Topping"] UNITS

A. Increased natural gas liquids (NGL) in pipeline causing improper/inadequate relief venting/flare capacity -- substantiated in part

The volume of NGL's introduced into the pipeline is within the daily average allowances; however, since the requirement measurement is a daily average, increased amounts of NGL's can be introduced over periods of several hours. These increased amounts when vented to a flare or relief vent can exceed the capacity of the flares (usually for a brief period of time).

B. **Hydrogen sulfide (H2S), Nitrous Oxide ("NOX"), benzene emissions and the absence of adequate monitoring facilities for gas emissions** -- substantiated

The audit team reviewed the October 12, 1993, Memorandum which verified personnel interviews regarding the lack of procedures and capability to measure gas going to the CTU flares and that flow measurements are not performed. This allegation was substantiated.

SAFETY SYSTEMS

A. **Welds on fire water systems are not full penetration welds** -- substantiated in part

This issue is partially substantiated. The welds are not full penetration welds for the fire pipe system, nor were they designed to be full penetration welds. The internal surfaces of fire pipe systems are cement coated, which will not support full penetration welds at each one of the joints. Full penetration welds will not provide the appropriate internal surfaces for proper application of the cement coating at the weld joint due to the internal configuration of full penetration welds. The application of full penetration welds would create a spalling condition of the concrete. This in turn would allow corrosion to take place around the circumference of the pipe.

B. **Foam system at Valdez Terminal inoperable for 3 years**
-- unsubstantiated

The audit team found no indication on any of the records reviewed that the foam system was inoperable for any length of time. This allegation was not substantiated.

USE OF UNCERTIFIED MATERIALS

A. **Material used for Atigun reroute was uncertified**
and
B. **Uncertified materials used for welding at Valdez Terminal**
-- substantiated in part

The Discrepancy Reports (DR's) and Nonconformance Reports (NCR's) were reviewed for the issues involving the use of uncertified materials at both Atigun reroute and the Valdez Terminal. Traceability of material, by Alyeska's program, does not extend to the field installation. The Alyeska program relies on only certified material, when required, to be receipt inspected and forwarded to the field for use. Alyeska does not have a system in place to track heat or lot numbers for certified material installed in the TAPS in the event of supplier recall notices. The DR's/NCR's were dispositioned and closed based on Alyeska's program. This program, however, in the assessment of the audit team, is not adequate for assuring traceability of materials.

MANAGEMENT:

MONITORING/OVERSIGHT -- substantiated

A. **Pipeline systems monitoring/adequacy**
B. **Adequacy of oversight systems**
C. **Documentation/reports, guides, and checklists**
D. **Follow-up procedures/practice**
E. **Adequate staff/training**

The management systems in place for the TAPS are inadequate for the degree of complexity and technical difficulty of the system. The underlying allegation regarding lack of adequate monitoring and oversight is substantiated.

UNAUTHORIZED PRACTICES/INCIDENTS

A. **Overriding Quality Assurance Manual (QA) #36** -- substantiated

There are multiple revisions to QA-36. The audit team focussed on the current revision, No. 7, and found multiple instances of noncompliance with the manual. Further, there is no evidence of which the audit team is aware to prove that a proper quality assurance program had been required by the previous QA Manuals or that the manuals were adhered to by the TAPS project since operation of the TAPS began. This allegation was substantiated.

B. Unauthorized project supervisors -- unsubstantiated

The audit team in its review did not find any information to support the allegation that project supervisors were unauthorized. This allegation was not substantiated.

C. Failure to implement QA-36, revision 5 -- substantiated

The audit team focussed on the current revision No. 7, and performed a review of revision No. 5 and found multiple instances where requirements had not been implemented. Further, there is no evidence of which the audit team is aware to prove that a proper quality assurance program had been required by the previous QA Manuals or that the manuals were adhered to by the TAPS project since operation of the TAPS began. This allegation is substantiated.

D. Violations of National Board inspection codes -- substantiated

The audit team found violations of the National Board inspection codes. This allegation is substantiated.

E. Violation of State regulations -- substantiated

The audit team found violations of state regulations, particularly in enforcement of the electrical code.

F. **Editing/falsifying inspection reports to conceal findings** -- unsubstantiated

The audit team did not find information relating to the editing or falsifying of inspection reports to conceal findings.

G. **Construction of ballast water treatment impound basins begun before all inspection criteria were prepared** -- substantiated

This allegation was substantiated.

H. **PS-6 Heat Exchanger not inspected since 1982** -- unsubstantiated

The audit team did not substantiate this allegation. The heat exchanger was inspected and replaced in the summer of 1993. According to the authorized inspector's listing, the heat exchanger did not require inspection in this time period.

I. **Air stripper motors have improper labeling** -- substantiated in part

This concern had been an open deficiency item for several years and was just recently resolved. During the course of the concern, motors in fact had an inconsistency between their certification documents and the labels. The air stripper motor identification nameplates which are currently installed on the air stripper motors at the Valdez Marine

Terminal properly reflect engineering and Underwriter Laboratories (UL) requirements.

LABOR PRACTICES/CONDITIONS

A. Some Alyeska technicians do not have certificate of fitness (Electrical) -- substantiated

It is the audit team's finding that this allegation has been substantiated by both technicians and inspection personnel. It is unclear to the audit team that the state required fitness program for Alyeska personnel serving in the maintenance, projects, and inspection areas are properly experienced in the specific responsibilities required of them to support the TAPS. This is exacerbated by the lack of specific proceduralized instructions and criteria.

B. Alleged drug and alcohol abuse -- unsubstantiated

The audit team did not have sufficient input to perform a detailed or a specific investigation regarding this allegation. The current program in effect recently was evaluated and generally found adequate.

ADDITIONAL ALLEGATIONS RECEIVED BY THE BLM/QTC AUDIT TEAM

1. **Air Contamination of Stevens Village by Pump Station No. 6 (PS-6)** -- unsubstantiated

The audit team received an allegation that there were hazardous fumes (namely benzene) being emitted from the Topping Unit operation (tanks and flare stack) that were reaching Stevens Village (a native community) approximately twenty miles up the Yukon River from PS-6.

Two members of the audit team traced the air corridor that a plume could follow to Stevens Village. This was performed by studying plume data, reviewing maps and air current data, and by flying the route in a helicopter. It was the assessment of the audit team that conditions do not exist such that benzene (which is heavier than air) could travel from PS-6 as an organized plume to the Yukon River, approximately one (1) mile away, and turn uphill and upwind, travel the approximately twenty miles to Stevens Village, and present a danger to the health and safety of the residents.
This particular concern is unsubstantiated.

2. **Heavy metals contaminating the Yukon River from Pump Station No. 6** -- unsubstantiated

Another allegation received was that a drinking water well at Pump Station No. 6 tested high in heavy metals, specifically

arsenic, and is being purged by pumping the well through a hose, down a hill into a ravine which led to a stream which ultimately empties into the Yukon River, creating a hazardous condition for nearby native populations that live and maintain businesses along the Yukon River.

The audit team reviewed the recent history of the well in question and inspected the well site. A seismic event reportedly disturbed the well site and changed the appearance of the water due to iron oxide contamination. Alyeska had the well water quality tested for primary heavy metals and cosmetic secondaries. The retest reports show that the primaries were below EPA levels, specifically, arsenic was approximately twenty times below EPA maximum allowable levels, suspended solids were above EPA allowable levels. The well was being purged in an attempt to clear up suspended solids. It should be noted that the well was not being used, nor is it now being used, for site personnel potable water purposes.

Additional inspection and evaluation by the audit team, visually at ground level and from a helicopter, did not indicate a likely potential for the water being purged from the well to contaminate the Yukon River.

I. CORROSION

An area that Alyeska is heavily involved in is the cathodic protection program. Alyeska is funding a program with the University of Alaska with active participation by the State of Alaska. Presently, Alyeska does not have criteria or standards established for performing preventive maintenance, including testing, to verify the effectiveness of the various cathodic protection systems that are in place (e.g., under tanks, tanker loading berths, underground).

The preventive maintenance programs for electrical equipment exposed to the elements is inadequate. The cable trays and electrical power distribution centers (PDC's) (e.g., PDC No. 7) are poorly maintained. Also discussed as an imminent threat is the lack of inspection and maintenance of the pumps and valves associated with the terminal fire pump houses. The corrosion monitoring of these salt water systems is totally inadequate.

The three (3) pig monitoring programs were also reviewed by the audit team, i.e., the NKK pig for corrosion monitoring, the magnetic flux pig for corroborating the ultrasonic data along with the known history of corrosion in the pipe, and the inertial curvature pig and ultrasonic sensors used to

determine the position of the pipe along its route. The strong concern of the audit team is that there is no common thread that pulls all these programs together. In the assessment of the team, these programs are conducted as engineering study programs with none of the discipline or interface with the Alyeska QA program.

A further concern of the audit team, which is discussed as an imminent threat, is the lack of a QA program that monitors the integrity of the piping system girth welds. In general, the data recorded by the NKK pig is acquired for the uniform internal sections of the pipe over the length of the pipeline. The pig, therefore, is incapable of reading any data of the weld or its direct interface with the pipe at either side of the weld joint.

Neither is there a QA/QC program in place to determine the integrity of these girth welds through an in-service inspection program. These thousands of girth welds have gone uninspected from a nondestructive examination program since their initial construction was performed. There is, therefore, no method in place to verify that the configuration/integrity of the girth welds has not changed or

degraded since construction. There has been no effort made, either through nondestructive examination (NDE) or aging and surveillance programs to assure that the original welds will continue to perform as designed and constructed.

II. LEAKS/SPILLS

The audit team reviewed the history of leaks/spills associated with the TAPS (i.e., Alyeska TAPS systems or those activities that support such as tanker trucks) beginning in January of 1977, through mid-September of 1993. The data reviewed included those identified spills that occurred on land, water, or at the docking berths at the Valdez Marine Terminal. The types of spills included:

- crude oil
- refined oil
- diesel fuel
- hydraulic oil
- ballast water from tankers
- lube oil
- turbine fuel
- gasoline
- transmission fluid
- drag reducing agent

The quantity of the spills varied from less than a gallon to thousands of gallons.

The total numbers of spills associated with the TAPS reviewed by the audit team during the time span from 1977 through September 1993 are as follows:

1/1/77-12/31/89 -- 949

1/1/90-12/31/90 -- 188

1/1/91-12/31/91 -- 357

1/1/92-12/31/92 -- 337

1/1/93-9/15/93 -- 344

Very few of the spills reviewed were a direct result of the TAPS mainline pipe leaks. The main emphasis of the audit team was to determine if there was an indication of an uncontrolled process of the mainline piping system that resulted in a trend of leaks and spills. No such trend could be identified.

The principle part of the leak detection system, as far as being able to predict a leak or to make a statement that a leak has occurred in near-real time, is the computer model that operates in the main computer at Valdez. Its capability, at best, is at the rate of about 1500 barrels per day. This detection capability can only take place when conditions along the pipeline have been stable for a period of time as long as nine days. For shorter periods of time

and for unstable conditions, or for noisy conditions, the capability to predict spills falls to a number near 7,000 barrels per day. Over a long time period, the average capability to predict gross leakage is approximately 3,000 barrels per day. The computer program receives data from Pump Station No. 1 that includes the rate at which oil is metered onto the system, which include a statement about pressures, sediment content, specific gravity or density, and water content. This information is compared to information about the output from Valdez and from the taps along the line.

One of the problems in making a total prediction is the fact that the transit time along the pipeline approximates five days; i.e., oil that is entered on one day is not delivered in Valdez until approximately five (5) days later. This means then that the oil which is flowing through a particular location, or perhaps being spilled at some particular location, has to take into account velocities and pressures along the pipeline. Included are other conditions about near- and later-time changes in those parameters along the pipeline, so as to be able to make a statement of what amount of oil has been spilled.

Another limiting factor considered is the accuracy with which the input oil volume is known. The metering system does well to meet an accuracy of 0.02%, or 2 parts in 10,000. The oil that is being delivered from one of the taps along the pipe or at the output has about that same accuracy. Consequently, none of the calculations can be expected to be any more accurate that those established values.

A computerized data evaluation of the difference between the oil predicted to be delivered at Valdez and the oil actually delivered is equated approximately every half hour. In the event that that number exceeds the present accuracy number, which is also computed, then an alarm is made indicating an excess output which could be thought of as a spill. That information is used by the controller to notify the superintendent of SCADA operations at Valdez and the manager of the Valdez facility. They consider whether or not this is an indication of a spill in their estimate and notify Alyeska management. Several more readings are required before the size of the spill, if it is a spill, can be predicted or whether or not subsequent readings indicate that the error limit was reached but that a real spill was not predicted. For an average accuracy statement of 3,000 barrels per day, a single reading is indicative of 100+ barrels and therefore,

if it turns out that several readings follow indicating that kind of number (i.e., a plus number), then the indication is of a spill. In the event, however, that the next few readings alternate between a plus and a minus number (i.e., an indication of spill and indication of no spill), then for that alarm, no spill is reported.

Alyeska has contracted with SSI in Houston to develop a computer program which is expected to be more accurate in terms of the prediction methodology. It is anticipated that the enhanced program will result in an average number below the present 3,000 barrels per day.

Additionally, Alyeska has recently implemented a cathodic protection and monitoring program for corrosion control of crude oil storage tanks. There have been significant leaks through the bottoms of the tanks due to corrosion. Alyeska is also in the process of implementing a reasonably large program to clean up the remains of these leaks and to enhance their program of prevention through cathodic protection and increased tank level monitoring and inspection.

The audit team reviewed the adequacy of spill prevention system planning and found this overall program to be

adequate. The audit team also reviewed some of the spill response drills conducted to the various specific types of spill responses, and found the conduct and results of those drills to be adequate.

The audit team reviewed the maintained status of one of the response vessels supporting SERVS. The vessel slings, ropes, pulleys, reels, and storage of flammable and corrosive paints and solvents in the paint locker and in abandoned work areas were of significant concern to the audit team. This findings, however, was mitigated by the immediate response of the safety representative and by the pro-active programs in work by the SERVS safety representative to include the issues discovered on the vessel in an expanded preventive maintenance and inspection program controlled by Alyeska SERVS.

The SERVS present approach to an integrated and strong safety program administered by the Safety/IH Field Specialist, SERVS, was described as a strength by the audit team.

III. A. EARTHQUAKE/EARTHQUAKE MONITORING:

CAPABILITY OF CABLES/CABLE TRAY SUPPORTS TO WITHSTAND SEISMIC/EARTHQUAKE CONDITIONS

The BLM/QTC audit team considers the capability of cable tray supports, and therefore of the cables, to withstand seismic/earthquake conditions to be indeterminate. This threat is exacerbated by another current imminent threat which exists due to the fact that many safety system cable trays are overfilled and overloaded. Of additional concern are the threaded rods used to support the cable trays and some conduit runs. The stresses in some screws/threaded rods supporting the cable trays are marginally high in dead loading and unacceptable for live loading conditions.

The failure of the cable trays under seismic conditions could cause the cable trays and cables to swing and fall, tear loose their connections, and/or otherwise render the cables unable to perform their intended function. An additional separate problem with the cables is the cables that are not tied into the trays. This increases the potential severity of the other problems with the cables and cable tray supports which have been detailed herein.

Under earthquake conditions, cables could be freed from the trays, whip, and disconnect, do damage to other components and equipment, and if still alive, possibly cause electrical fires. The damage could include the possible loss of fire alarm capability, which could exacerbate the fire damage, and even cause loss of control of an entire active station.

It appears that the cable tray supports might be able to withstand earthquake conditions in the vertical direction; however, based upon rough calculations by the BLM/QTC audit team, the ability of the cable tray supports to withstand earthquake conditions in the horizontal or side direction is unproven and doubtful. It is important to note that this potential imminent threat exists regarding *properly loaded cable trays* (which is not the condition which currently exists in many instances).

III. A.1 PIPELINE/VERTICAL SUPPORT MEMBER (VSM) CONTACT POINTS

During the aerial surveillance activity which was conducted as part of this audit on September 11 and 12, 1993, it was noted that the pipeline is in contact with the VSM at what was estimated to be dozens of locations. These were not bumper locations. A portion of these were photographed. The *Engineering Design Procedures-Pipeline for the Trans Alaska Pipeline System* were requested from Alyeska.

A review of MS-31 revealed that pipeline/VSM contact points are to be reported during bi-weekly aerial and periodic ground surveillance activities. MS-31-1 explains:

> "2.2.2 Aboveground Pipeline- There are three basic conditions that must be systematically checked in the surveillance of the aboveground pipeline from the geotechnical standpoint:
>
> "a) Is there evidence of significant VSM movement?
> "b) Is there evidence of ground failure?
> "c) Is the pipe located correctly on the crossbeam?"

2.2.2.3 Movement of the Pipeline on the Crossbeam -- Under different temperature conditions the pipeline is designed to move laterally between the two VSM constituting a bent. The side to which the pipeline moves when hot is called the hot side and the other side the cold side. With the hottest temperatures expected, the pipeline bumpers will not come in

contact with the VSM on the hot side. It is expected that the pipe may contact a bumper in an earthquake event. The pipeline should not come in contact with the VSM where there is no bumper. Therefore, it will be necessary to observe the pipeline during normal operations to see that there is no contact at the bumper or at any other location along the line. This is necessary to provide some reserve of motion available in an earthquake event.

2.2.6 Aerial Surveillance -- The observer should concentrate his attention on the items discussed in the following sections...On the pipeline, the observer should be able to detect contact between the pipeline and a VSM.

Table 2.2.1 Aerial Surveillance Summary (attached) shows the following:

"Line feature:	Aboveground line
"Problem:	Pipeline displacement
"Visual Clues:	Pipe against VSM
"Critical Limits:	Any
"Additional Checks:	Report for Special Ground Inspection
"Remarks:	Anything that can be seen from the air is probably critical."

The *Handbook of Pipeline Surveillance* states:

"Pipeline Damage or Misalignment-The pipeline should be checked for evidence of damage or misalignment due to vandalism, earthquake, vehicle impact and adjustment to operating temperature. Look for the abnormal conditions listed below during surveillance:

"* Pipe insulation touching the VSM without bumper. This should never happen under normal conditions. If discovered, check to see if pipe insulation is damaged or if there is evidence of VSM movement and report adverse conditions."

The *Engineering Design Procedures-Pipeline for the Trans Alaska Pipeline System*, paragraph 1.5.2.5 Bumper Design System states:

"Seismic bumpers connected to the above ground pipeline supports at programmed nodes (supports) protect the pipeline from high magnitude local stresses upon impact between the pipeline and the support structure...

"a. Lateral Loads. Intensity of lateral loads is based on empirical data from a three dimensional 'computer model'.

"Seismic loading governs the design and two design conditions exist:

"1. The operating earthquake is considered to produce a maximum force of 135 kips on the bumper system.

"2. The contingency earthquake is considered to produce a maximum force of 190 kips on the bumper system.

"b. Design Considerations. The pipeline is protected upon impact with the support structure during seismic activity by 'cushioning' the blow and distributing the high local stresses over a larger area. This is accomplished utilizing an energy

absorber (resilient material) which deflects seven inches under maximum design load, and a contact shoe (beam) mounted between the two clamps on the pipeline."

The *Engineering Design Procedures-Pipeline for the Trans Alaska Pipeline System*, paragraph 1.5.2.5 Shoe and Clamp Design states:

"a. Loading...

"2. Horizontal load at intermediate supports, except where bumpers are required, is equal to 10 percent of the vertical load. The 10 percent factor is the maximum coefficient of friction between beam and shoe contact surface. It applies to static and dynamic loading. At supports where a bumper is provided, the maximum value of the horizontal bumping force, under the dynamic condition only, is 190 kips for the contingency earthquake and 135 kips for the operating earthquake.

"3. Loading conditions considered for design are:

"a. Operating + live load + operating earthquake with pipeline longitudinal slope equal to 70 percent. Maximum vertical load = 155 kips. Maximum horizontal load without bumper =15.5 kips with bumper = 135 kips.

"b. Operating + live load + contingency earthquake with pipeline longitudinal slope equal to 70 percent. Maximum vertical load = 180 kips. Maximum horizontal load without bumpers = 18 kips and with bumper = 190 kips."

In a meeting held with Alyeska engineering at their corporate offices on October 5, 1993, Alyeska engineers explained that there are actually 421 such contact points.

Additional engineering data was requested from Alyeska in an attempt to understand the premise behind the original designers concerns related to the contact points and the level of concern within Alyeska today.

The data indicates that the original designers anticipated that the pipeline would touch the VSM only at the bumper and then only during a seismic event. The design horizontal load of 18 kips for all non-bumper horizontal supports is an allowance for friction only and does not consider the impact load between the VSM and the pipe. There are 421 Pipeline/VSM contact points today. Lacking additional engineering data which more fully explains (1) the failure mode analysis during a seismic event and (2) why the contact points are allowed to remain, the integrity of the above ground section of the line during a major earthquake event is indeterminate.

III. B. GLACIER SURGING

The *Federal and State Stipulations governing the Trans Alaska Pipeline System*, paragraph 3.8.1 states:

> "Surveillance systems sufficient to give adequate warning of impending surges on any glacier that could damage the Pipeline shall be instituted prior to transmission of oil through the pipe."

The surveillance and monitoring procedures governing the glacier surging issue were requested from Alyeska. An aerial reconnaissance of the Black Rapids Glacier was completed on September 11, 1993.

A meeting was held in Alyeska's headquarters building on Tuesday, October 5, 1993, to clarify the Glacier surge issue. An Alyeska engineer explained the procedures described in the documents referenced above and displayed a series of annual photographs illustrating the location of the toe of Black Rapids Glacier for the past several years.

The Surveillance and Monitoring Methods Manuals explains the procedures which are to be employed by those individuals charged with the responsibility of monitoring the pipeline on a periodic basis. Much of the information contained in one manual is repeated in other manuals.

contact with the VSM on the hot side. It is expected that the pipe may contact a bumper in an earthquake event. The pipeline should not come in contact with the VSM where there is no bumper. Therefore, it will be necessary to observe the pipeline during normal operations to see that there is no contact at the bumper or at any other location along the line. This is necessary to provide some reserve of motion available in an earthquake event.

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"Seismic loading governs the design and two design conditions exist:

"1. The operating earthquake is considered to produce a maximum force of 135 kips on the bumper system.

"2. The contingency earthquake is considered to produce a maximum force of 190 kips on the bumper system.

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III. C. SLOPE STABILITY

The surveillance procedures governing slope stability issue were requested from Alyeska. Alyeska provided the following documents within which the monitoring and surveillance procedures for slope stability are explained. Additionally, the following report was provided:

> Report to Alyeska Pipeline, 1992 Line-Wide Slope Stability Review, Golder Associates, March 1993.

An aerial reconnaissance and a ground assessment of two problematic slopes was completed on September 12, 1993. The sites were selected for evaluation because of interesting slope stability problems. The first site, Treasure Creek, is located near Fairbanks at Milepost 442. The second site, Squirrel Creek, is located at Milepost 717. Alyeska P&CM Randy Smith served as the Alyeska representative at the Treasure Creek site and Alyeska engineer John Globig was the owners representative at the Squirrel Creek site.

Alyeska has had to go in at the Treasure Creek site and realign the pipe on the crossbeam and adjust the vertical support members (VSM). Ground monitoring instrumentation has been installed at the site and there is evidence of recent survey activity. The Squirrel Creek site has suffered from

chronic settling and lateral movement of the VSM. There are VSM at the site which are radically "out of plumb". Alyeska has gone in at Squirrel Creek, realigned the pipe, and extended the VSMs to compensate for the settling. Additionally, thermosyphons have been installed in an attempt to stabilize the subgrade. Subsurface instrumentation has been installed at the site and tabs have been welded on many of the VSM to facilitate accurate survey monitoring.

The field survey indicates that Alyeska is contending well with the slope stabilization problem at both of the evaluated locations. The pipe is aligned correctly on the cross beam and the situation is being monitored on a regular basis.

III. D. RIVER EROSION

The audit team conducted an aerial surveillance on September 11 and 12, 1993. River erosion conditions were investigated at mile post (M.P.) 47 and Moose Creek south of Fairbanks. The Alyeska Pipeline Surveillance Procedures and Monitoring Methods Manual (MS-31) was the source document utilized by the audit team for evaluating surveillance and monitoring procedures. The erosion repair work recently completed at Hess Creek (M.P. 378.7) was also reviewed by the audit team.

The river erosion problem at M.P. 47 appears to be sufficiently mitigated, as does the much less serious problem at Moose Creek. A review of the Hess Creek documents shows that they also appear to be adequate.

The audit team's assessment is that Alyeska's response and program regarding river erosion is being satisfactorily evaluated and maintained.

III. E. PERMAFROST

Permafrost is a very broad category. The term "permafrost" refers to any soil which remains below 32°F for two years or more. Permafrost had a large impact on many aspects of the pipeline design. Permafrost has a bearing on each of the two sites visited by the audit team on the slope stability investigation. Further, all above-ground portions of the pipeline, all animal crossings incorporated in the above ground, and the refrigerated buried sections of the line were originally designed to maintain the permafrost thermal regime.

A combination ground and aerial surveillance of the portion of the pipeline which extends south from Prudhoe Bay to Atigun Canyon was conducted on September 11, 1993. The Alyeska P&CM owners representative accompanied the audit team. This portion of the line contains several long above-ground sections in thaw unstable permafrost areas with short, buried sections which provide for animal crossings. The animal crossings are of particular interest because of the thermal degradation problems associated with the operating buried hot pipe in ice-rich permafrost.

An aerial surveillance of that portion of the pipeline extending from Treasure Creek near Fairbanks south to Valdez was completed on September 12, 1993. Ground inspections related to thermal degradation of permafrost subgrade were conducted at the south end of Mainline Refrigeration-1 (MLR-1).

The first animal crossing (MP 1.5) south of Pump Station #1 and the Pipeline transition from above ground to below ground (MP 12.0) south of Pump Station #1 was inspected on the ground. All other animal crossings south to Atigun Canyon were inspected from the air.

Monitor rod data for the first animal crossing and the transition section was reviewed by the audit team.

It was observed by the audit team that the work pad covering the pipe at both the animal crossing and the transition section contained longitudinal cracks in the area above and along the pipeline (East) edge of the pad. Monitor rods, however, are installed on the pipe at both locations to evaluate any changes in the cracking. At other animal crossing locations to the south, monitor rods were also observed. Many of these other animal crossings had

thermosypons installed to stabilize the subgrade temperatures. Monitor rod data has been collected periodically at the animal crossing since 1980 and at the transition section since 1982. Data indicates that there has been settlement within the range of that which would be expected.

Also, many of these other animal crossings had thermosypons installed to stabilize the subgrade. Monitor rod data has been collected periodically at the animal crossing since 1980 and at the transition section since 1982. Data indicates that there has been settlement within the range of that which would be expected. The audit team has found the monitoring program and Alyeska's response to areas of concern to be adequate.

III. F. ROCKBOLTS

Audit Results

The audit team reviewed Alyeska's draft Trans-Alaska Pipeline Surveillance Procedures and Monitoring Methods, MS-31-4, Second Edition, dated March 29, 1993, which contained a description of the Valdez Marine Terminal and the key features which are to be observed during routine surveillance. The draft contains a checklist which includes rockbolt and rockbolted slope surveillance items. The audit team, however, found this checklist to lack definitive and adequate inspection and acceptance criteria.

Review of Documentation

The audit team reviewed the Valdez Marine Terminal rockbolt inspections performed by Golder Associates in 1992. The report provided "a permanent record of important data to assist in future reviews of the stability of the rock cuts, and to assist in the design of any future stabilization measures."

The report contains information by rockbolt number for the following items:

1. Location
2. Drilling data

3. Installation data

4. Lift-off test data

Alyeska engineering, in discussions with the audit team, explained that there was some deterioration of the rockbolts identified during the periodic surveillance activities conducted at Valdez Marine Terminal by Golder Associates. Upon further investigation by Alyeska, the extent of the deterioration warranted the replacement of a portion of the rockbolts.

The documents reviewed by the audit team indicate that the hazards produced by the rock slopes in the Terminal area are well understood. Also, problems associated with deteriorating rockbolts were rectified soon after the problems were identified.

IV. OIL STORAGE TANKS

A. Integrity/conformance with standards

Alyeska is currently responding to a change in the OSHA laws for the State of Alaska, and has implemented an ongoing program to perform internal inspections of all bulk oil storage tanks. They are approximately 30%-40% through completion of this program, which is scheduled for all tanks to be inspected by 1997. Also as a part of the control of oil storage tanks, Alyeska has implemented API and State regulations which require daily, monthly, yearly, and five-year cycle inspections of the outside of their tanks and their tank impoundment facilities.

IV. OIL STORAGE TANKS

B. Bulk storage tanks at pump stations and Terminal are classified as "break-away" but not all have been tested internally

Although the concern is correctly stated, the tanks are now on a testing schedule accepted by the State to ensure internal inspection at designated intervals.

IV. OIL STORAGE TANKS

C. And the absence of adequate monitoring facilities for gas emissions

It was the finding of the audit team that there is no program or capability in place to monitor the volume of emissions from bulk storage tanks. There is also no monitoring of emission volume from tanker vents at Valdez when they are being filled. There are, however, monitors in the area surrounding bulk storage tanks, inside buildings, and other areas where benzene, hydrogen sulfide, and nitrous oxide may be present in confined spaces which could affect operating personnel. Emission of benzene, nitrous oxide and hydrogen sulfide are only monitored for concentration where personnel safety is a consideration.

IV. OIL STORAGE TANKS

D. Improper use of surge tanks for refining feed stock

The initial design for surge tanks had their primary use as a reservoir for balancing line flow. When the surge tanks are used to provide refining feed stock, the initial intent of the design is shifted. The effect of the shift is to provide an opportunity for more vapor emissions than if the tanks were used solely to balance line flow. At present, there is no emissions monitoring system in place to determine emissions for either condition.

Although a review of the design provided the flow path by changing valve positions, the audit team could find no procedural authorization for Alyeska to use the surge tanks for any purpose other than for line balancing. Discrepancy reports could not be located by Alyeska that identified the failure of the surge drum to perform as required by the design, i.e., to dewater/desalt the crude oil prior to using the crude as feed stock to the topping unit. There was a lack of procedural authorization to by-pass the failed surge drum and utilize the surge tanks (55,000-gallon tanks) as the method to dewater the crude oil. This, coupled with the increased volatile/hazardous fumes created by the venting activity resulting from accelerated movement of crude oil

supporting the topping unit, with no emission monitoring capability, led the audit team to determine that this process constituted an improper use of the surge tanks.

V. VALVES

A. Resistance valves [sic -- should be "values"] for insulating flanges for loading arms at Valdez Terminal do not meet specifications

The current established engineering specifications for resistance values of the loading arms at the Valdez Marine Terminal have been found by the audit team to be conservative and have been incorporated into the Alyeska preventive maintenance test program. The resistance value is effective in limiting the current path between the ship and the loading berth through the loading arm and provides an adequate safety margin for the installation. This allegation is unsubstantiated.

Several years ago, the isolation flange resistance was not adequately controlled. It is adequately controlled now. The consequence before being adequately controlled was that the near zero resistance values could cause arcs which could have ignited residual volatiles in connecting pipes.

When a tanker ties up at one of the berths, it is expected to have a different electric potential from that of the berth. The tanker's potential can result from its passage through the sea, but the more probable cause is the proper operation of its corrosion protection system. The berths also have

corrosion protection systems, but they cannot be expected to match the potential of an incoming tanker. Therefore, a controlled discharge to a common potential is required.

Loading arms are designed to provide a safe electrical interconnection between the tanker and the berth by utilizing an isolation flange between the coupling fitting and the main arm of each loading arm assembly. Proper performance of the isolation flange required specific, controlled assembly and maintenance techniques which had not been followed by Alyeska until difficulty with the connection of the arms to tankers was experienced.

The present rebuilding procedures assure proper assembly of the isolation flange. The present periodic maintenance requirements assure proper protection by the flange. The exact details of measuring the flange resistance during rebuild should be clarified, and the specific instrument to be used in the rebuilding procedure and the maintenance procedure should be specified, calibrated, and controlled.

The data from the maintenance measurements should be trended to predict the continuing effectiveness of the arms. From

that assessment, the need for periodic cleaning and rebuilding of the flange should be determined.

V. VALVES

B. Various (RGV 73, 98, 98A) commanded and uncommanded valve shutdowns due to failures

Although the subject valves were closed (shut down), they closed because the system worked. The circuitry associated with Remote Gate Valves RGV-73, RGV-98, or RGV-98A was the source of the shutdown in each case. But in no case did the actual valve act in a commanded or uncommanded method; particularly, there was no uncommanded valve shutdown with respect to the three valves. The valves that were closed were closed as a result of the shutdown program, which had been triggered by circuitry in the three valve stations. This allegation was unsubstantiated.

Audit Results

Remote Gate Valve 73 closed because of defective circuit wiring. Remote Gate Valve 98 was commanded to close by an automatic program triggered by a failed power supply. Remote Gate Valve 98A was commanded to close by an automatic program triggered by technician's error. The consequence of these closures was loss of pumping time. No damage was done to the pipeline.

Remote Gate Valve 73 closed when wires in its control circuit that had been kinked in their conduit during original

installation, shorted to the metallic ground of the conduit. The valve circuitry interprets the ground as a command to close. Since no command had been sent from the Operational Control Center (OCC), the closure of RGV 73 was treated as an emergency and the Pipeline was shut down. Troubleshooting found the problem and the valve was opened manually and kept under control by in-place technicians until the faulty wiring was replaced. No damage was done to the Pipeline. As a protection against the possibility of damage, an automatic shutdown procedure was written and implemented in the control computer.

RGV 98 was commanded to close along with other RGV's by the automatic program when a technician working at the RGV 98 power and control building inadvertently caused the signal system to send a false "valve in transit" signal to OCC. Nothing in the valve or its circuitry was at fault. The technician and the Controller, recognizing the error, restored the pipeline to full operation without damage. To make the error by the technician less likely in the future, the circuitry for the "valve-in-transit" signal was moved to a less accessible location on the station terminal strips.

V. VALVES: VARIOUS (RGV 73, 98, 98A) COMMANDED AND UNCOMMANDED VALVE SHUTDOWNS DUE TO FAILURES -- 2

RGV 98A was commanded to close along with other RGV's by the automatic program when a power supply in the RGV 98A power and control building failed, causing the circuitry to send the "valve-in-transit" signal to OCC. When the faulty power supply and another which might also have been damaged were replaced, the system was restored to normal operation. No damage to the pipeline was incurred. Although no detailed failure analysis of the power supplies was published, similar supplies in other RGV stations were checked and verified for proper operation.

VI. PRESSURE VESSELS

Noncompliance with State requirements (pressure vessel testing)

and

Failure to test pressure vessels according to State standards

In an interview between the audit team and the Manager of Alyeska Quality Services (QS), the following response to the audit team was provided by the Manager regarding the numbers of projects being conducted requiring inspection support and is QS maintained a listing of those projects: "No, we really don't. In fact, we don't even know how many ASME vessels we have out there, because every time we go out and do an inventory, we find another one."

Based on a review of inspection reports by the audit team, there was no evidence that the tests conducted on the vessels reviewed were not in compliance with State standards. However, the response by the Manager of Quality Services indicating that possibly all of the pressure vessels supporting the TAPS may not yet have been identified, leaves the issue of verifying total compliance of Alyeska's compliance to State testing requirements indeterminate.

VII. A. ELECTRICAL PROBLEMS: WEEPING WIRES

Audit Results

It is the assessment of the audit team that the "weeping" conditions identified for the electrical cables installed at the Valdez Marine Terminal and at the pump stations does not affect the electrical performance standards required of the cable. Therefore, the safety margin of the cable has not been affected.

Additionally, the weeping condition does not present a fire hazard over and above that of the originally purchased cable. The cables exhibiting the weeping condition have, however, aged and to an extent lost their plasticity/flexibility and should not be reused (e.g., pulled/relocated).

However, there are additional areas of concern that were raised during the audit team's evaluation of the weeping wires situation:

1. Inadequate documentation and lack of retrievability of procurement records. An issue, which has not been investigated further by the audit team, may be the inability to obtain replacement Arctic-grade cable in a timely fashion if and when it is needed for outside applications.

2. The procurement process is not controlled by implementing procedures and is not an integral part of the Alyeska quality assurance program.
3. Past and continuing failure by Alyeska management to adequately resolve in a timely fashion technical and programmatic issues which are raised by its workers.
4. Past and continuing failure by Alyeska management (as exemplified by the weeping wire issue) to address, communicate, and follow-up with workers, QC inspectors, or other employees or contract personnel regarding concerns and issues raised by them.
5. Past and continuing failure by Alyeska management to give serious consideration to harassment and intimidation of workers in the workplace, or to take immediate and strong measures to eliminate such practices.

A. **BACKGROUND**

One issue investigated by the audit team was "weeping wires." This description is somewhat a misnomer in that the "wires" themselves do not weep. The weeping condition originates from the outer insulation of the cables. This issue relates

to a dripping or an exudation of material of kind of a gooey nature from the installed power cables.

This issue was addressed by a former Alyeska Quality Control Inspector during the July 14, 1993, hearings before the U. S. House of Representatives Committee on Energy and Commerce and Subcommittee on Oversight and Investigations. In his prefiled testimony, he stated, in pertinent part:

> "Weeping Wire Issue: During a general electrical inspection of Pump Stations one (1) through twelve (12) I conducted between January and March of 1990, I documented and reported the condition of the electrical cables as wet and dripping. These electrical cables are installed throughout the Pump Stations in cable trays that are installed within the hallways approximately eight (8) feet above the floor level, connecting various area locations together. The electrical cable then terminates at Motor Control Centers. Where the cables are installed in the hallways and walkways within the cable trays, evidence of the liquid coming out of the cables showed up on the top of the florescent lighting fixtures that are hanging below the cable trays; the liquid would then fall to the floor as drops. Electrical cable that dropped vertically from the cable trays into the Motor Control Centers and other electrical distribution, switch-gear, released liquid which went down into the electrical apparatus.
>
> "Upon notifying Alyeska Engineering of the condition of the electrical cable, I was informed they were aware of the problem, that the liquid leaking from the cable was mineral oil, and that it in fact did not contain PCB's. Also, the reason the mineral oil was separating from the electrical cable was that the cable was 'aged out' and this was a symptom of the cables' deterioration.
>
> "Deterioration of the electrical cable eroded the cables' ability to perform its designed functions such as current carrying capacity. Deterioration also affected coordinations with circuit and system

> overcurrent ratings, ambient correction factors, compliance with requirements of product listings to safely conduct circuit currents which can result in an overload, a ground fault or a short circuit. The mineral oil being released from the electrical cables has some degree of flammability that could increase the propagation of smoke and fire within and through the Pump Station and the Marine Terminal in Valdez, which would create an increased hazard to the safety of personnel, the environment and the integrity of the pipeline and related facilities. . . . "

This issue was also addressed in the July 14, 1993, congressional hearings in the Prefiled Testimony of the current President of Alyeska (since 4/15/93). In the Addendum to his prefiled testimony of July 14, 1993, "Summary of Actions Taken to Resolve Physical Problems," he stated, in pertinent part:

> "<u>Arctic Grade Cable</u> -- Engineers from Fluor Daniel have reviewed the condition of the cable and all associated documentation. They believe that there is no effect on current operations or safety as a result of the 'exuding' of the polymer plasticizer from the arctic grade cable. Fluor Daniel has developed a plan to perform tests on six sections of cable using the flame and flammability specifications of the Underwriters Laboratory test for qualifying cable for use in a cable tray (UL-1277 test). The testing was performed by ETL Testing Laboratory, a nationally recognized testing laboratory certified to perform fire and flammability testing standards. The test has already been completed, and the cable met smoke and flammability requirements of the UL-1277 test. Alyeska will develop an inspection program to monitor for any change in the condition of the cable."

B. <u>Incorrect Application of Arctic Cables</u>

The audit team's investigation revealed that the cables in question were covered by the manufacturer with a special material to increase the flexibility of the cables in the extremely cold Arctic conditions under which they are required to perform. The use of this material apparently does indeed assist in better performance of the cables under these harsh Arctic conditions. However, at higher temperatures (such as room temperature or above), the special material used tends to run and drip; it is this aspect which is referred to as the "weeping" of the cable (i.e., "weeping wires").

The preponderance of system cables, both power and signal, are jacketed with neoprene that was moderated by the manufacturer, Rockbestos, with butyl oleate to extend the low temperature flexibility of the outer covering. At room temperatures, the butyl oleate as observed loses its viscosity and is able to escape from the neoprene. At still higher temperatures, the butyl oleate will run and drip. Where blobs and drops form, they resemble tar and are messy from a housekeeping standpoint. The exudation can be burned if ignited but the cable ratings are not changed by the presence or absence of the blobs or drips.

The fabrication process does not result in a tight bond of the butyl material to the neoprene, so as to have the butyl material remain in place under all temperature conditions. When this Arctic type of cable that is presently installed indoors and subjected to the higher indoor temperatures, there is a tendency for some butyl to escape from, or be released from, the neoprene (much like sweat is released from a body at high temperature). The result is that the material, upon reaching the outer surface of the neoprene, tends to smooth itself out and give the cable cover, the sheath, a shiny surface.

With even more increase in temperature up to temperature numbers in the neighborhood of room temperature or above, the result is that some of the material will tend to run; and though the amount of butyl released is a very small run, the viscosity is still very high, and it therefore forms around the cable and, drawn by gravity, will accumulate in a drop-like formation on the bottoms of the cables, much like heavy candy at the end of a stirring spoon will accumulate. While the audit team did not evaluate this, it is presumed that if the temperature is raised high enough (perhaps over 100° F.), the material, the oleate, could actually form a drop which would separate from the underside of the cable and fall.

C. **Performance Testing Methods and Results**

Alyeska had the cables submitted to a flame test, the results of which were found to be satisfactory for their application. Those flame test results were reviewed by the audit team, which concurred with the test methodology and the results. Alyeska also subjected the cables to a high voltage withstand test and a mechanical extension test, which were found to be satisfactory.

In the assessment of the audit team, use of the present cables *in their present applications*, both exterior and interior, poses no additional risks to the safe operation of the Pipeline or to the public and environment/ecosystem.

The audit team arrived at its assessment of cable integrity through its own visual examinations in the field, on-site testing and sampling by the audit team, personnel interviews, and documentation review. The audit team examined many points along the cable runs in Pump Station Nos. 1, 6, and 10. In addition, at Pump Station No. 10, the audit team performed an investigation which included not only a visual examination but a somewhat more complete look at the material that is referred to as "the weep" or "weeping material."

D. **"Weeping" Material Description and Usage**

Examination of the failure analysis effort that was conducted by Alyeska over the past two (2) years indicates that the material is fundamentally or predominantly butyl oleate. It is a tarry substance, gooey, sticky, difficult to manipulate that was used to moderate the neoprene covers on the main power cables, manufactured by Rockbestos.

The material moderated the arctic or low-temperature capability of the neoprene jacket to be shaped. Ductility of the cable has to be such that a cable can safely be pulled into a tray, pulled around a corner, bent to enter a conduit, or carried up a pole. Unless the material makes the outer covering, the outer sheath, more plastic, then it is subject to extreme force stress and consequently strain or elongation of the material. With the insulation material properly softened and able to accept bending for shaping and installation, under controlled installation procedures, the cable integrity is assured.

One of the objectives of the audit team was to determine if any of the butyl had reached a sufficiently low viscosity to actually form drops which would have separated and then

accumulated on some fluorescent tube reflectors mounted immediately below the cable run of interest.

A second objective was to discover whether or not simple washing compounds typified by Formula 409 could perhaps aid in removing, through a washing process, the material from the cable.

A third objective was to closely examine, with the naked eye, the surfaces of the "weeping" cables. The purpose of this examination was to discover whether or not there was any apparent change in the cables caused by something other than: the thermal conditions; the ambient temperature; or wind/air current conditions that would account for differences in: the shininess or striations of the upper surface; accumulation of rings of runs; collections to prepare for a falling bead of butyl below the cable; or any other indication that might reveal more about what had happened from the time that the cable was installed until the time of the audit team's examination.

These objectives were met with the assistance of Pump Station No. 10 personnel. An Alyeska technician gathered the

necessary materials, obtained the permit, and participated with the audit team throughout the test.

The audit team started about 9:30 A.M. on September 11, 1993, and ended about 10:30 A.M. The audit team utilized: clean rags, wiping material; white gloves; Formula 409; a small scraping tool that much like an inch-and-a-half putty knife; some glass vials with lids, to collect samples; a step ladder; a work permit; and a fluorescent trouble light. The audit team closely examined the underside of one of the cables that had the largest accumulations of the butyl on its undersurface. Close visual examination reinforced the concept that the weeping conditions were simply the runs of the material from over the entire body of the cable, collected and formed a run, which formed the possibility of a drip.

The material is very tarry in nature and very difficult to move on the cable. Pushing on it with a finger would cause it to move, but it was like pushing tar. It does move, and the problem from a housekeeping standpoint is that it is very sticky.

Several samples along a run were removed by shearing them from the rest of the cable. The material parted from the neoprene easily; there was not a strong bond between it and the neoprene. There is a stronger bond, actually, inside the material holding it to itself than holding it to the neoprene. In other words, it doesn't particularly wet the neoprene surface.

After several samples were collected and placed into a marked jar, an attempt was made to see if the material would wash with water or soap-based solution. Common Formula 409 was used to saturate a small corner of a rag and then the underside of the cable was vigorously scrubbed. Where the pieces had been removed from the glossy surface, the neoprene continued to look just as it had; and the shiny surface of the butyl continued to be a shiny surface. Some surface dirt was washed off, some residue from the neoprene was obtained, and a very minor amount of the butyl was removed. That piece of cloth was cut out of the rag and was stored as Sample No. 2.

A segment of cable that appeared to have striations was closely examined. The material, instead of having a surface

which was highly glossy, had what appeared to be striations as if, for some reason or other, there had been a certain amount of condensing or compressing or sliding together of the material, perhaps as a result of a wind current or temperature of the cable. The audit team just knew it was different, and there was some interest as to why it was different. Was it a different material? What else about it was different?

To assist in answering these questions, the first thing the audit team did was try to scrub that kind of surface with another application of Formula 409, with no success. Since there was no lifting of the material by an abrading or scraping process, no neoprene was exposed, and consequently no black came off. A minor amount of brown the color of the butyl showed on the rag, but clearly there was no real washing action. That piece was cut out of the rag and stored as Sample No. 3.

The tool was now applied to the cable in a shearing mode to try and part some of the surface material from the neoprene of the outer sheath, and a sample was taken and removed from the knife, put on a piece of cleaning tissue and stored in a bottle marked Sample No. 4. There appeared to be no visual

difference in the content of the material; however, no chemical analysis was performed and no physical analysis was made beyond visual. The fact that the cable was adjacent to others examined, subject to the same atmosphere, was accumulating the same material, had a tendency to ball up and give the same kind of undersurfaces, the preparation for drip, all indicated to the audit team that it was looking at the same material, the surface of which had been changed by ambient conditions rather than some inherent characteristic of the butyl material itself.

An examination was performed by the audit team of the upper surfaces of the reflector of the fluorescent lamp, a pair of 48" tubes in a fixture suspended directly below the cable tray. The upper surface was uniformly covered with dust; the ballast box, which is above the reflector surface, was also covered with dust, and the top surfaces of the cable tray above the cables (the sides of the cable tray) showed very much the same kind of dust. No analysis of the thickness of dust was made, but a quick pass with a gloved finger showed that the gloves picked up the dust, scattered it (it was dry), and left a clean streak.

The purpose for looking at the tops of the fluorescent lights in some detail was to visually discover whether the butyl material might have dropped directly from a cable to the tops of the reflectors. There was no indication that could be seen with a close visual examination using a fluorescent trouble lamp that any exudation reached the top of the fluorescent covers. The examination was confined to what one could do at some 12" or so with a fluorescent light with everything in place. There was no effort made to chemically assess cleanliness, but it was felt from the way the remainder of the material still adhered to the cable was that it would have been large drops, not microdrops, on the reflector surfaces, so blotches or spots or drops were what was being searched for.

In a later examination, the butyl was warmed up and when it warms up, it forms balls very much like candy balls are formed in the cooking process, and those are relatively large (perhaps between 50 and 100 thousandths of an inch (.050" and .100") in diameter), and so they would tend to drop and leave on a cool surface fairly large blobs, perhaps as much as a tenth or 150 thousandths of an inch (.1" or .150") in diameter.

As a result of the preceding, the audit team felt that there were no large droppages and no capability whatever to assess microdroppages.

Some assessments of ambient temperature and conditions were also made. First, the place where the audit team was working was above Lamp No. 3 measured from the west end of Hallway No. 2, Pump Station No. 10. The center of this lamp is approximately 39-1/2' east of the west edge of the flange of the east column at the door to the shop area, Hallway No. 1. The temperature of the cable that had the drips, bulges, or drip preparation places that were removed was 68.4° F. at about the time of the measurements. That was the first cable, from which Sample No. 1 was taken. The temperature at the cable where the second sample was taken (the striated cable) was 68.0° F. A check of the room temperature about in the area where the audit team was, approximately 2' away from the cable tray, was 70° F. And the temperature of the ballast at the top of the fluorescent was 74° F.

The cables in the tray were too close together to permit making a measurement of the diameter either in the vertical or in the horizontal directions (i.e., transverse to the length of the cable). The audit team moved down the cable

(i.e., away from the hall) to where a turn separated some of the cables far enough to insert a vernier caliper to make some measurements of cable diameter. One cable was measured: the horizontal diameter was 2.53 inches; the vertical diameter was 2.52 inches; and the tolerance on both of those numbers is approximately plus or minus 10 thousandths of an inch (.010").

Subsequently, an additional sample was taken from an adjacent cable nearby (i.e., in the next ladderway in the cable tray), and retained as Sample No. 5. The purpose of Sample No. 5 was to perform a flame test. The test was to determine what kind of a problem might be involved and not in any way to characterize the problem or to quantify it. A small amount of the removed material was placed on a paper book match far enough back from the head so that the match flame would have to stabilize to progress from the head to the sample (the distance was approximately 3/8"). The flame was observed as it reached the part of the match on which the sample was placed. As the match burned and as the flame moved toward the butyl, it first tended to melt the butyl. As the flame and the butyl came together, the butyl was ignited as the temperature of the butyl rose and the energy available to continue flaming increased, the butyl tended to flare. As a

data point, the flare was about the same size as the way a match acts when originally struck. As soon as the butyl was consumed, the whole process subsided. The match burned as it had earlier, and was extinguished.

A second test was performed where the main body of the match was wrapped in a piece of very light aluminum foil and then the butyl was applied mostly on top of the foil, but a little bit left to encounter the flame as the flame came back toward the butyl. The purpose of this was to discover whether the butyl, upon being ignited, would continue to burn on its own or did it require the flame from the match to not only ignite it but to provide enough energy to maintain the capability to vaporize. The butyl burned in very nearly the same way as it had in the earlier test. Where the butyl burned, the temperature rose high enough to damage (either melt or burn) the aluminum foil and to convert the material inside the aluminum to ash.

These limited field tests demonstrated that, upon being ignited, the butyl will burn until it consumes all of the material. It will then stop burning, but if other elements of combustible materials continue, then the burning rate will be determined solely by the other combustible materials.

Another interesting effect took place. It was that, with that sample, not only did the butyl tend to ignite, but in the process of ignition and burning, some of the butyl became viscous enough that it escaped from the site of the burning and dropped to a safety container immediately below. No flame followed the drop. The audit team was careful to observe this, and the temperature apparently dropped so fast when the material contacted the pan, that it went well below any vaporization point and it became the same gooey residue as before.

No other tests were conducted at this level of field testing. A piece of 2-foot cable was provided by Alyeska as a sample for a visual representation for interested persons to examine at a later time.

E. **Documentation Review**

The audit team requested engineering to provide a vendor catalog for Rockbestos. A catalog was provided, but it did not include the Arctic wire installed at the pump station. A catalog for the Arctic cable installed at the TAPS locations could not be located by Alyeska and one has not as yet been supplied to the audit team.

In discussing the Arctic cable situation with engineering, the audit team questioned how a re-order might be made. Engineering indicated that it is an extremely difficult process because the cable is not available unless requested as a special order. This particular cable is no longer listed by Rockbestos, and is only available under a special production run.

On Thursday, September 23, 1993, the audit team visited Alyeska Purchasing and inquired about the Arctic-grade cables procurement process. Purchasing stated that the present wire company did not stock it, which confirmed what the audit team had been told the day before by engineering. Procurement did not retain the vendor catalog that specified the Arctic cable which is installed in the field that produced the "weeping" condition.

This further demonstrated to the audit team that the as-built configuration, for a major component selected, could not be evaluated. Procurement basically utilizes a commercial style of ordering for safety system components. Purchasing's relationships with the vendors are the main source of the evaluation that forms the basis to decide whether or not a

given vendor is going to be capable of meeting the requirements with reliable equipment. It depended, in terms of the cable, very much on the listings in the catalog for the cable and, except in very rare instances, did not provide or call for any interface between quality assurance and the vendor's quality system.

There is no documented system to control the vendor processes, purchases, or quality. It is done, and in good many cases well accomplished, but in the assessment of the audit team, it is done because of people's experience or because of their sense of loyalty. However, to the point that the TAPS can become a threat to the health and safety of the public, in the assessment of the audit team, this response based on personal considerations (as opposed to documented programs, procedures, and practices) is unacceptable.

Further discussions with Alyeska electrical engineering determined that Alyeska, with the concurrence of the Joint Pipeline Office, would perform further cable testing within a sampling program fashioned after Military Standard 105D. Military Standard 105D would increase the sample size of the numbers of cables to be tested. The plan calls for an

electrical megger tests to form the basis of cable acceptability. It is the assessment of the audit team that a megger test is almost devoid of any useful information in regard to how the cables are safely able to perform. A megger test shows that the cables are not shorted, it does not measure the insulation capability; i.e., the megger reveals the ohms value (if the cable is really good, it will give a very high number of ohms), but that does not provide any indication at all of the cables' ability to withstand a voltage stress test. It is solely a test of circuit impedance.

The other test that was discussed was a hi-pot test. The hi-pot test induces a voltage higher than the operating voltage (e.g., twice as high), and if the cable did not fail, still would not provide the data as to where the cable would fail or if there was any degradation in the cable's performance over the years.

When the 600-volt cables were checked, they were performed with a withstand voltage and got in the range from 34,000 to 43,000 volts for 600-volt cables. A rough estimate by the audit team revealed that if a hi-pot were performed, the 13,000-volt circuit cables would probably achieve between

100,000 and 150,000 volts. This is not the kind of test that would be conducted on cables in place.

Part of the reason for performing the megger and hi-pot tests was that this could be done on cables that could be disconnected or in circuitry which could be switched off and performed in the cable trays, rather than having to extract pieces of cable and subjecting them to a test. This method, however, is not a test that measures electrical cable performance. It is a test which only checks the application of the cable.

It is the understanding of the audit team that Alyeska intends to have an additional set of tests run on samples of the cables in the Valdez Terminal, utilizing Military Specification 105D to define the sampling, utilizing a megger test and a nondestructive hi-pot voltage test.

VII. ELECTRICAL PROBLEMS

B. Cable trays at the Valdez Terminal tangled and having an improper mix of high and low voltage cables

The cables are tangled and do have an improper mix of high and low voltage cables; they do not meet the National Electrical Code (NEC) requirements. Consequently, this station and Alyeska are not in compliance with the right-of-way agreements both from the federal and the State governments. This allegation is substantiated.

VIII. REFINING ["Topping"] UNITS

A. Increased natural gas liquids (NGL) in pipeline causing improper/inadequate relief venting/flare capacity

The volume of NGL's introduced into the pipeline is within the daily average allowances; however, since the requirement measurement is a daily average, increased amounts of NGL's can be introduced over periods of several hours. These increased amounts when vented to a flare or relief vent can exceed the capacity of the flares (usually for a brief period of time).

VIII. REFINING ["Topping"] UNITS

B. Hydrogen sulfide (H2S), Nitrous Oxide ("NOX"), benzene emissions

Pump Station Nos. 6 and 10 (PS-6 and PS-10), visited by the audit team, have topping units. PS-6 has a rebuilt topping unit for producing diesel fuel. The audit team reviewed the flow diagram of the topping unit and discussed with Alyeska responsible personnel the containment of fumes from the top of the tank and from all parts of the topping unit. This included the use of the burnable residual gases from the topping operation. It was described to the audit team that the topping unit produced gas during the operation which was mixed with propane and used as a pre-heater fuel for the cracking tower in a Bjorn heater. Due to the use of the surge tanks to support the topping unit, the constant movement of oil in and out of the tanks causes increased levels of H_2S, NOX, etc., emissions to the atmosphere. A monitoring system does not exist for measuring the gas emissions from the topping unit surge tanks.

The audit team inspected the area where the topping unit was located. It was still in the assembly reconditioning stage. The topping unit had been in operation when the plant was installed, but then had been discontinued and was being

reactivated. It was further explained that all the valves, particularly motor-operator valves, had been removed, cleaned, inspected, readjusted, and reinstalled, and that preventive maintenance programs that are to be associated with these valves would be available when the project was complete. Additionally, all parts of the system would be inspected as part of the completion package on the project with a PSM team as described in the OSHA requirements for this particular operation.

As part of this rebuild process, the heat exchangers, which are pressure vessels, were reinspected according to the requirements of the State of Alaska to the ASME Pressure Vessel Code. The process also included an upgrading of flow meters to enhance the capability of the leak detection model. Reportedly, the previous flow meters did not adequately provide information to Valdez to make an accurate estimate of the amount of crude oil consumed in the topping unit.

IX. SAFETY SYSTEMS

A. Welds on fire water systems are not full-penetration welds

This issue is partially true. The welds are not full penetration welds for the fire pipe system, nor were they designed to be full penetration welds. The internal surfaces of fire pipe systems are all cement coated, which will not support full penetration welds at each one of the joints. Full penetration welds will not provide the appropriate internal surfaces for proper application of the cement coating at the weld joint due to the internal configuration of full penetration welds, which creates a spalling condition of the concrete. This in turn allows corrosion to take place around the circumference of the pipe.

The issue of full penetration welds arose during oil storage tank inspections when an inspector looked inside the pipe orifice, the entry of the fire pipe system into the tank and saw partial penetration welds that were rusting. At that point, this was reported and it was determined that that particular section of pipe up to a ruptured disk which is several feet from the tank, sees oil and not the combination of fire water and foam. The welds that were not full penetration welds but should have been in the section of pipe leading from the tank to the fire pipe line rupture disk.

This short portion of the line from the tank to the rupture disk is filled with oil (not water/foam) from the tank and should have been full penetration welds. These welds are being reworked by Alyeska in compliance with their in compliance requirements.

What happened was that all the tanks have to be inspected, all the lines leading from the ruptured disk through the valve, through the spool piece to the tank, must be reconfigured from partial penetration welds to full penetration welds. But everything prior to the ruptured disk needs to be and remains partial penetration welds.

The further issue that this brings up is that when repairs are made to the fire pipe, such as sleeves added, and welding takes place on the outer surface of the pipe, that tapping and the heat and the process involving welding can indeed attack the integrity of the cement coatings, which could create spalling and entry of the concrete past the ruptured disk and into the tank. It also means that those particular areas where the spalling occurs can create a corrosion problem and indeed result in further expansion of the corrosion process in and around that particular weld area.

IX. SAFETY SYSTEMS

B. Foam system at Valdez Terminal was inoperable for three years

This issue deals with the foam system at Valdez Terminal being inoperable for three years. The audit team found no indication on any of the PM records reviewed that the foam system was inoperable for any length of time.

The audit team did find in the foam mixing room (a separate room for that specific purpose) was that on the manifold for the foam mixer, there was a hold tag that referenced a nonconformance number; the nature of the hold tag indicated that the foam mixing system that was in place was not adequate to meet the needs of the firefighting equipment and needed to be updated. Whether that system had been updated or not, none of the individuals, from the fire chief to maintenance to operations, could say what the status of that foam mixing station was. Although the audit team did not substantiate this particular allegation, additional questions were raised because of the original allegation.

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X. <u>Use of Uncertified Materials</u>

One issue was that the material used for the Atigun reroute was uncertified. The other is that uncertified materials were used for welding at the Valdez Terminal.

Regarding the material used for welding at the Valdez Terminal, and the overall material traceability program that is in effect, the material traceability program, while it may keep materials related to a purchase order up to the place of installation, once those materials are physically installed, there is no way then to trace the materials back out to verify that in fact they were certified.

The audit team was unable to gain any specific knowledge regarding the use of uncertified materials for welding at the Valdez Terminal, other than to say that under the program that is currently in place, once the materials are consumed, there would be no way to guarantee traceability. There is a DR which specifically refers to uncertified materials being used at Valdez, but it was closed out by saying that all the materials are certified at the point of receiving. There is no way, if a manufacturer contacts Alyeska to advise something to the effect that there is a problem and that the heat numbers on specific weld rods purchased by Alyeska

turned out to be defective and that Alyeska needed to go out into the field and reinspect all of the girth welds for whatever the failure mechanism was on those heats, there is no mechanism by which Alyeska could identify the particular weld rods or welds on which the rods were used.

On items such as the washers that are used in the isolation flange for the loading arms (where there is no stamping or paint), there is no traceability. In fact, one of the materials that the audit team looked at in a project was a bag of washers; that whole shipment had been accepted as being a valid shipment, and these washers were form-fit, custom-made washers for a specific application. In asking the inspector how he verified that those were the correct washers, he said that it met the quantity and that that was the bag that was left that did not have a part number on it, so he assumed that those were the correct washers. He said that if they were not correct, they would find it in the field.

An additional aspect of this issue is the inability of the field inspector to verify that certification does in fact exist. Even when material is received with the proper certification, the certification goes into the purchase order

file; although the receiving inspector has access to this certification, the field inspector does not. The field inspector must rely on his belief that the material would not have gotten to him had it not already gone through receiving. There are no travel tags or other stamps, tags, marks, paint, or any specific inspection identification status on any of the materials in any of the warehouses dealing with general safety-related stock items. The only application where the audit team saw tags used was on project-specific items that do not go into the system at the pump stations or the Valdez Terminal; it is a separate project.

Implicitly (if not specifically), the field inspectors have been released from the obligation of certification of the materials as they have been used, including materials which might come from a stock room; they no longer have to do that. The field inspectors are forced to adopt the position that the material would not be there if it had not been certified, whether this is a valid assumption or not; they are totally unable to verify such certification for themselves.

Even if one were to assume that a piece or a group of pieces were properly contained in some sort of container or bag, and that they do carry a label or an identifier which gives the

information which is put on whatever it might be at the point from which they are transhipped, the original receiving to the intermediate receiving, for several uses, and the quantity is divided, so that now we have two kinds of quantities, at that point it is the stockman's or the warehouseman's responsibility to see to it that the proper identifiers are carried on the two new containers.

On the pipeline, that is accomplished by use of the bar coder by the stockman or warehouseman; he can actually construct a label. Presumably the only thing that changes from the earlier label, whatever it contained, is the count. So in the new bag, A, it's count A; and in the new bag, B, it's count B; where A and B together equals what came in originally.

The next question is: Is there any inspection of this? Does it require any kind of certification in the sense that the traceability has been verified by anybody but the stock room? The answer apparently is that there is none. They have a bar code at Valdez and a bar code at Anchorage, but they do not use it. It is not part of their system. The audit team has not been able to find any evidence in the program that the labels were instead rewritten or that traceability was

accomplished in some other manner. The bar code system, to the best of what the audit team has been able to ascertain, was not in effect at the time of the Atigun Pass rework.

The initial concerns open another whole set of concerns, and that is that the capability for the final product to be certified as having been made out of fully certified materials is problematic at best, since the identifications are lost and all the records of the identifications are discarded at the point of installation when they remove it from either the stock room on support spares (not associated with a specific project, i.e., they need it for a work permit, etc.). When they take it out of the large container that houses everything for a project, that material, whatever box, bag, or container it comes in, is discarded. And in a similar fashion, when they take it out of the warehouse for a repair project or when they take it out for routine maintenance, there is a similar kind of discard.

Therefore, although the specific allegation originally raised was not substantiated by the audit team, the team's investigation has given rise to additional concerns.

XI. A.1 MAINTENANCE

Maintenance comprises a group of activities designed to keep plant and equipment in good operating condition. This is generally achieved by identifying all of the components requiring maintenance and developing schedules and criteria for when maintenance is to be performed. Maintenance data is recorded and analyzed to determine trends in performance. With this information, predicative schedules can be drawn to minimize down time.

Implementation of the Alyeska TAPS maintenance activities were audited by the BLM/QTC audit team at the following locations:

- Pump Station No. 1 (PS-1);
- Pump Station No. 6 (PS-6);
- Pump Station No. 10 (PS-10); and,
- Valdez Marine Terminal.

Audit Results

The audit team identified the following strength pertaining to maintenance at Pump Station No. 1:

A maintenance supervisor recognized the need to enhance the retrievability of data concerning preventive maintenance required for each item included in the Pump Station No. 1 PM program. The supervisor also

equipment list which identifies only those items of equipment that comprise safety systems (i.e., that equipment relied upon to protect the health and safety of personnel, the public, and the environment/ecosystem) also does not exist. Therefore, there is no mechanism to verify that (1) up-to-date equipment vendor maintenance manuals and/or technical directives exist for all items of equipment which require maintenance, and (2) that proper preventive maintenance is being performed for all items included in the safety systems and systems important to safety.

B. Implementing Procedures

Implementing procedures do not exist which define and control maintenance activities included in either the POWOR or MAXIMO work order corrective maintenance programs.

C. Maintenance Programs

Neither the preventive maintenance nor corrective maintenance programs incorporate adequate work instructions or inspection criteria which assure work tasks are properly performed and/or inspected. With the exception of isolated activities, quality control inspections and/or hold points do not exist in either the preventive maintenance or corrective maintenance programs.

Maintenance activities, both preventive and corrective, for electrical systems lack sufficient detail and criteria to assure that the National Electric Code (NEC) requirements are being met. The staffing levels and experience and qualification of personnel supporting electrical maintenance and electrical inspections are inadequate to assure the integrity of vital electrical circuits and equipment.

Alyeska has not implemented a comprehensive program to analyze and trend the hardware condition data that results from the preventive and corrective maintenance programs. Neither has Alyeska attempted to develop through a trending program the ability to determine the causes of deficient conditions nor to implement lasting corrective actions to preclude their recurrence. They are further deficient in developing a predictive maintenance program to assure the protection of the health and safety of the public and the environment/ecosystem.

D. Detroit Diesel PM Procedures

The audit team reviewed the completed annual PM on the Detroit diesel engine used to power the fire protection - fire foam system at Pump Station No. 6, equipment tag No.

36-FP-2PK, task number 161181/YO1.

The PM was deficient in several areas including:

1. the lack of specific call-out of type parts/materials/tools required to be utilized during performance of the PM;
2. missing and/or incorrect parts/materials/tools called out to be used during performance of the PM;
3. incomplete/inadequate/inaccurate/missing call-out of steps required in order to properly perform the PM; and,
4. steps were required to be performed but were not indicated as being performed.

The PM was released to Pump Station No. 6 on 5/3/93 and complete on 5/27/93. The PM required three (3) hours to complete.

The following specific deficient conditions were identified by the audit team:

1. <u>Detroit Diesel PM Parts/Materials/Tools Deficiencies</u>
   a. A "fuel filter and gasket" is specified which indicates that a cartridge type filter is required. However, the engine requires two (2) spin-on type filters to be used. Neither the

part/model of the filters are called out, nor are the correct quantities identified.

b. Two different types of calibrated pressure test gauges are required, neither of which are identified by range required and/or model numbers.

c. "Alyeska Type 10 Lubricant" (engine oil) is called out for use. However, the "10" is lined out (no initial or date) and "5W40" is handwritten next to the strikeout (step 003). In discussion with the PS-6 Operations Supervisor, type 10 oil was changed from 10W30 oil to Mobil Synthetic 5W40 oil, which apparently was used. The correct quantity (numbers of quarts/gallons) of oil to be used also is not called out.

d. Fire foam level is required to be checked (step 001); however, foam is not listed by either nomenclature or type/part number.

e. "Rust Inhibitor" is required to be added (step 004, P.); however, rust inhibitor is not listed for use, neither is the type inhibitor identified. In discussion with the PS-6 Operations Supervisor, a litmus paper verification of the coolant system integrity is required during performance of this step. Neither the requirement to perform the test nor the type litmus paper are called out.

f. The type of anti-freeze to be utilized is not called out.

g. Step 005 requires the air filter to be changed out. The type/model number of the filter is not called out. However, in discussion with the PS-6 Operations Supervisor, the air filter utilized for the diesel engine is an oil bath type unit, not a dry paper type. Neither the type solvent required to clean the filter sump, nor the type oil and quantity to be used in the sump are called out.

h. Step 007 requires the Pump Carrier Bearings to be greased. The required grease to be used is not called out.

2. <u>Detroit Diesel PM Procedure</u>

a. Step 002: "Perform annual PM on Detroit Diesel Engine," item A, states: "Isolate fuel filter & drain filter contents. Loosen nut at top of filter, remove dirty element and clean case. Install new element and new gasket and replace filter assembly. Fill the filter case with clean fuel & restore to system. Check for leaks."

As identified in 1.a. above, the diesel engine fuel filters require two (2) spin-on type filters. This step is incorrect.

The proper steps to assure proper filling and installation of the two (2) spin-on filters is not specified.

b. Step 004 states:

"Flow test fire water pump (pressure & rate). ***NOTE: Complete task 161181-M03, fire foam header flush, in conjunction with this step.

***Meter Data:

Pump Station 6:

Meter Factor:	170
Full scale GPM:	1700
150% rated flow GPM;	1500
150% flow meter reading:	8.8

"A. Close 6" block valve, isolating pump from header.

"B. Close control valve supplying water pressure to foam tank isolation valve.

"C. Open both 6" block valve on recirc. line to raw water tank.

"D. Close valves from orifice meter to diff. press. gauge.

"E. Install calibrated press. Gauges on suc & disc side of pump (+ or - 2%). Remove existing gauge & set aside.

"F. Auto-start diesel engine & allow pump to stabilize.
NOTE: Suction requires a duplex gauge.

"G. Partially close 6" block valve on downstream side of orifice meter until gauge reading on pump disch equals 125 psi.

"H. Open valve from orifice plate to DP gage & read DP meter

Flow Rate 5.9 Speed 1750

"I. Verify & log pump flow rate in GPM & engine RPM.

"J. Shut down diesel engine.

"K. Close valves from orifice plate & depressurize DP gauge.

"L. Close both 6" block valves on recirc line to raw water tank.

"M. Reopen control valve supplying water press to foam tank.

"N. Open 6" block valve to fire water header.

"O. Remove calibrated press. gauges from pump. Reinstall permanent gauges.

"P. Add rust inhibitor and check anti-freeze to -65 deg. F."

The following hand-annotated note appears in the margin next to this step which states: "T. Martin informed. Local info indicates data incorrect. Acceptable reading 5.9-6.0." The initials "RLA" (the Operation Supervisor) appear next to the note. In discussion with the PS-6 Operations Supervisor, both the GPM values of 1500 for

150% rated flow and 150% flow meter readings are incorrect for the PS-6 engine.

This issue, however, is only being tracked for resolution by the informal note in the body of the PM and by the original phone call to T. Martin sometime in May of 1993.

Additionally, the utilization of task 161181-M03 to perform the step is only a "NOTE," not a dedicated step requiring verification. The procedure utilized to perform the Foam Header Flush was not attached (as completed) to this PM, as verification that the flush was properly conducted.

The valve number identifications required to properly perform steps A., B., C., G., K., L., M., and N. are not specified. This lack of adequate procedural instruction does not assure proper completion of required steps nor does it assure personnel and equipment safety.

Step 004, P., states: "Add rust inhibitor and

check anti-freeze to -65 deg. F." As discussed in 1.a.

above, the step as specified is incorrectly defined and was not indicated as being performed as listed. In discussion with the PS-6 Operations Supervisor, the requirement to periodically drain and flush the engine coolant system was not included in this PM. Neither is the step provided to perform a litmus paper integrity test of the system which would determine if additional measures (e.g., adding rust inhibitor) were required. Therefore, the integrity of the diesel engine coolant system is indeterminate.

Step 005 states: "Check and change air filter." As identified in 1.g. above, the change-out of the filter is incorrect. The procedural steps to: properly remove and dispose of the filter sump oil; properly clean the sump and filter; and, the type oil and quantity to replace in the sump, are not specified.

Step 006 states: "Change coolant filter." The diesel engine at PS-6 does not have a coolant filter installed. It has not been determined if a coolant filter should be installed or if this step is in error by requiring one to be changed out.

Step 007 states: "Grease pump carrier bearings." As identified in 1.h. above, the proper type of grease to be used to lubricate the bearings is not specified. Therefore, the integrity of the carrier bearings is indeterminate as well as is the resultant effect on the ability of the fire protection, firewater system to properly perform its function.

Step 008 states:

"Exercise handline valve

"A. Ensure fire foam header has been depressurized.

"B. Unscrew handline from the connection closest to the hand valve.

"C. Open the valve fully open. Note that it should operate smoothly and freely.

"D. Close the valve full closed. Note that it should operate fully and smoothly.

"E. Reconnect the hose line.

"F. When all valves and steps are completed, repressurize the fire foam header.

"G. Insure that inoperative valves are repaired."

In discussion with the PS-6 Operations Supervisor, the procedural definition to properly accomplish this step is not incorporated in this PM. The same instructional requirements contained in the step 004 Note (i.e., complete 1AW Task 16118-MO3) should also be applied in

the performance of step 008:F, in order to repressurize the system.

Regarding step 008 as performed, it is not clear how the step was completed. There is a "c" in the margin opposite the heading for item 008 (indicating some level of completion). However, no check marks or "c's" appear next to any of the items A through G. The valves required to be operated in sub-items B, C, D, and F are not identified by valve numbers, nor is there any indication (item G) that any inoperative valves were identified/repaired.

3. Detroit Diesel PM Closeout.

The following statement is included in the closeout of the PM Detroit Diesel:

> "Per regulatory requirements, this PM procedure has been reviewed at least once this calendar year, and any suggested changes have been forwarded to the appropriate pipeline/Valdez PM administrator."

None of the issues discussed herein, with the exception of 2.b. above, have been identified by Alyeska Operations personnel, nor have appropriate changes been incorporated to assure that the integrity of the fire protection, fire-water system safety margin is intact

by proper performance of this PM.

On page 1328 of the PM, there is a line for "SUPR SIGN"; however, the supervisor did not sign, and only initials (which appear to be "DAB") are shown.

The deficiencies noted in the Detroit Diesel PM are representative of those found in other PM's.

E. Pressure safety/relief valve maintenance review

An operations technician was performing maintenance on a pressure safety/relief valve at Pump Station 10 in accordance with an Alyeska preventative maintenance procedure (PM) for the valve in question. The PM had four basic steps, each with sub-steps, and a section for close-out information.

Step 001: Check set pressures on safety valves.

1. Isolate valve or shutdown system & remove relief valve.
2. Clean valve with solvent and wipe off excess.
3. Install relief valve on test stand. Pump up pressure to within 5% of set pressure.
4. Slowly increase pressure until relief valve opens.
5. If pressure relief valve opens at correct set

pressure, lower the pressure to 75% of set pressure. Then raise the pressure to 90% of set pressure to test for air leakage.

6. If valve tests correctly, remove from test stand & reinstall. If valve needs adjustment, perform step 002. If valve is leaking, perform step 003.

Observation of the procedure by the BLM/QTC audit team started at #2 in Step 001. The valve had been removed from the system, and transported by push cart to the maintenance area, referred to by some as the maintenance and test area. There was no protection of the valve while in transit from the field to the shop and none called for in the PM. There was a gauge or by-pass tube off this valve that was uncapped and unsupported during transit. The valve flanges were uncovered, and there was no supporting device for the valve (such as a case or wedge blocks) other than the tray of the push cart.

These transporting deficiencies would be unlikely to cause an unobserved problem from the field to the shop, but once the valve had been serviced and certified, an unobserved problem

(foreign material entering the valve) could occur on the trip back to the field for installation.

The technician cleaned the valve with solvent and wiped it down per part #2 of Step 001. While performing part #3 of Step 001, the valve relieved (popped) at 500 psi, prior to the 95% level of 518 psi. It was also leaking. The leaking started at approximately 450 psi. Part #4 became not applicable, since the valve had already opened. Part #5 became not applicable, since the valve did not open at the correct pressure. Part #6 referred the technician to Step 003 since the valve was leaking.

At this point with the leak and pop at 500 psi, the valve is now a nonconforming item per the Quality Assurance Manual, QA-36, Rev. 7, definitions & Section 15.1 and 15.2, effective October, 1992. One could argue, successfully, that the work is in process. However, QA-36 does not provide for in-process deficiencies. So, per the Alyeska QA program, the valve should have had a nonconformance report (NCR) written against it at this point. The valve should have been tagged, or otherwise noted as deficient, and work should have stopped on this valve pending disposition of the NCR. The technician continued to Step 003 per the direction in Step 001, part #6.

Step 003: Investigate Leaking Safety Valve

> "If the preceding steps have been carefully followed and the testing equipment and testing medium were clean, and a leak is still indicated, it will be necessary to dismantle the valve and inspect the seating surfaces. If dirt is the cause of leakage, a good cleaning and light polish are sufficient. If nicks or scratches show on the seating surface, they must be either lapped or machined out and the surface finished with a polish lapping. The valve must be retested as described above before it can be returned to its system. (Enter as new pop pressure.)"

The technician started dismantling the valve. The main assembly was removed from the valve casing. This assembly was then cleaned with solvent and wiped dry. After cleaning, observation showed that the "keeper" on top of the assembly was marred. According to the technician, the "keepers" at either end of the assembly were supposed to be able to be removed by hand. However, neither would release. This constituted a third nonconforming condition. At this juncture in the PM it is difficult to argue that the work is in-process. The PM says to dismantle. The valve would not dismantle the way it should have (hand release of the "keepers"). The PM did not account for this condition, so by default, work should have stopped. The PM should also have had a step to handle this contingency.

After consulting with several other technicians who happened in and out of the area, the lower "keeper" was forced out of

the assembly. On inspection, the lower two of five threads had been stripped to the base stock. The female section, which was part of the main assembly, had a cracked thread on the pick-up which was the apparent reason that the keeper wouldn't free up in the first place. This becomes the fourth nonconforming condition. The procedure used to dislodge the "keeper" is best described as brute force. One technician held the main assembly with a pair of channel lock pliers, while the other forced the "keeper" off with a pair of pliers. There were also marks on the top "keeper" indicating a similar treatment in some previous disassembly.

The technician decided that no further maintenance could be performed. He indicated he would most likely order a new or repaired valve from Anchorage and ship this one to them for repair or discarding. Later a member of the audit team noticed the valve strapped on a pallet in the shipping/receiving area destined for Anchorage. There still was no tag on it indicating that it was defective.

At a later date the PM was reviewed by the audit team. The technician had ordered a replacement valve as indicated in Step 004, Safety valve certification. The Safety Valve Test Certificate had been partially completed

and indicated on the disposition line that the valve was fouled and corroded. A choice for "leaking" was also available, but not chosen by the technician. The section on close-out information showed a work order number, a completion date, actual hours, a technician employment number, a supervisor employment number, technician initials and supervisor initials (signature required per the PM).

Since the PM did not have detailed or accurate instructions, and since there were no quality control or independent verifications called for, a substantial reliance is placed on the technician performing the work. In fact, if the valve had been cleaned successfully and returned to service, the technician would have been required, per the PM, to certify the valve. A review of the technician's training records showed he was certified in October, 1990 per IS-47 to perform the valve maintenance and valve certification.

The applicable section of IS-47 in effect at the time of certification was 4.15, Inspection Procedures for Safety Devices. Regarding tester qualifications it states in 4.15.3: "Testing of safety, relief, and safety relief valves shall be carried out by a person who has attended one or more relief valve manufacturer courses and who has been issued a relief valve tester qualification card by the Alyeska

Inspection Office. This requirement applies to all centers where the company operates a safety valve test bench facility. The relief valve tester's card expires after a 5-year period." No reviews, surveillances, audits, or other form of objective verification of the acceptability of the relief valve courses was available. Apparently, this verification was not performed. Without verification that the course material was adequate, that this adequate material was acceptably delivered, and that the technicians thoroughly learned the material, the basis of relief valve tester certification is indeterminate and inadequate. Additionally, no independent tester proficiency reviews are conducted. The same basic problems exist with the current procedures now residing in QS-97. The result is that technicians are not programatically qualified to perform the maintenance on relief valves.

If the leaky valve above had been able to be cleaned and returned to service, in addition to reliance on the technicians qualifications, the qualification or certification of the testing equipment would have also been required. As the section on measuring and test equipment in this report notes, the calibration of such test equipment is

unreliable. Also, the PM contains no spot to record the identification of test equipment used.

The review of this PM activity revealed an inadequate PM (no contingency for a valve that could not be dismantled); a PM in violation of Section 15 of QA-36 (nonconforming items); and an inadequate relief valve tester qualification and certification program.

F. Work Control

An organized, disciplined, and documented approach to work control is lacking throughout all user locations. This includes the loss of the ability to trend important information resulting from work orders and preventive maintenance activities, which provides basic information in the control of the safety margin of equipment essential to safety.

G. VALDEZ TERMINAL OPERATIONS DEPARTMENT FIRE AND SAFETY INSPECTION PROGRAM

The safety program as implemented at the Valdez Terminal by the operations department is inadequate. Inspections are not performed at the frequency identified in the safety requirements manual. The safety inspections are superficial and based on cost and schedule objective rather than

personnel and equipment safety and its potential effects on the public and the environment/ecosystem. Fire protection examples encompassing equipment/components at the various pump houses are inadequately maintained, resulting in the existence of hazardous conditions which could prevent the ability of the fire systems to adequately respond when called upon. The lack of adequate safety and fire inspections as part of preventive maintenance program and the lack of recognizing equipment in need of maintenance, as exemplified the following list (developed by Alyeska after touring the area with the audit team), places the health and safety of the public at risk:

Main Fire Water

1. a. West pump pressure gauge Salt build up
   Change out valve, nipple, and gauge

   b. Suspect - unsupported gauge (large moment arm)
2. Storage atrocious (north wall) Rack
3. Center pump,
   Crimped black hose needs replacing
4. Storage of flexitalic gaskets on air receiver
   Not advised
5. North wall unsupported instrument lines for flow meters
6. Diesel air compressor is it in PM system?
   When was last PM done?
7. West pump crimped, bent and cracking
   Black hoses need replacement
8. Support for valve platform - lack of concrete

grout

9. 2,000 gpm electric pump and associated piping need general cleanup, painting, remove salt

10. Spare 2,000 electric - pump had Stored nuts and bolts on it. Should be removed

11. Remove unsupported light fixture in all engine units control panels.

12. Parts in engine panels and Cabinets should be removed.

13. West control cabinet not grounded.

14. Inventory on flammable storage cabinets not displayed

East Fire Water

1. MOV-54-E BPI
Salt. Not painted, leaking seal
Corrosion - unclean, salt build up
Valve leaking on floor

2. MOV-54-EA D2.
Salt build up Scrape and paint

3. Chain Hoist
Broken link (tagged) repair or replace

4. Discharge line pressure gauge and valve
Needs support bracket due to long moment

5. Flammable storage cabinets -
List is posted but not accurate.

6. Salt water line upstream of foam check valves
1/2" stainless line salt corroded.

West Fire Water

1. West pump packing leaking.

2. Wooden cabinet and untreated wood stored against east wall

3. Scoon guns - Restrict access to foam skid

Remove guns.

4. West foam pump -
Repair gasket leak.

5. Water valves - east and west pump Valves show signs of corrosion.
Recommend cleaning and paint.

6. Danger tag on 1-1/2 valve downstream of check valve - What is status of danger tag and should it be hooked and if not should it be plugged?

The audit team is concerned about the lack of acceptance of responsibility for identifying and correcting valve corrosion issues identified by the audit team at the various fire pump house locations, as exhibited by the Fire Chief, and by the Electrical and Mechanical Maintenance Supervisors. This was especially disturbing due to the fact that the issue of corrosion of fire water system valves has been the subject of an intense investigation by Alyeska, of which the audit team was aware. The audit team reviewed the Valdez Firewater System Investigation Project T-6443, under cover memorandum dated April 23, 1993. This project was a part of an ongoing investigation begun in 1991. The project justification states, in part:

> "The Valdez Firewater System uses seawater as a fire fighting medium, which is extremely corrosive to valves and piping. In recent years there have been a number of valve failures.

> "As part of the 1991 and 1992 inspection programs, thirty-three valves were inspected and replaced. Approximately one half of these valves were corroded to the point of imminent failures. Valve failures appear to be the result of corrosion of the valve stem/gate connection, rather than the valve gate. . . ."

Safety and Loss Control Directory, Section 1: Workplace Safety, SLC Sec # 1.5, entitled Department or Facility Inspection, requires:

> Department Manager will establish inspection schedule with appropriate checklists.
>
> Assigned individual will conduct scheduled inspection of facility using checklist.
>
> Section Manager will review results and forward to appropriate organization for remedial action.
>
> Department Manager will review inspection and follow-up results at least semi-annually.
>
> Department Manager will ensure that appropriate actions have been taken to conduct a pre-startup safety review of new or modified facilities.
>
> Reference OSHA 1910.38; 8AAC61.270(p)

The Terminal, under the "Who Is Affected" column, requires that for all department or facilities, "Frequency as designated by manager, monthly is minimum requirement." These inspections are not being performed adequately or at monthly intervals.

H. <u>Alyeska QA Audits.</u>

The subject of the Alyeska preventive and corrective maintenance programs, and the results identified during the

audit process, were discussed in detail with various members of the Alyeska quality assurance (QA) organization. In addition to the several discussions with Alyeska QA personnel, the following Alyeska QA audit reports were reviewed by the audit team and the results of those revisions were also discussed with Alyeska QA personnel:

- Audit Report 92-A02, Pipeline Operations and Maintenance, issued May 19, 1992.
- Audit Findings Report, Audit No. 93-A06, Finding Nos. 1-8. (NOTE: This audit report has not as yet been issued.)

It should be noted that several of the issues and concerns identified by the audit team have also been, and currently are being, addressed as audit findings and observations by Alyeska QA personnel. Although the BLM/QTC audit team may not totally agree with the mechanism used by Alyeska QA to identify the seriousness of the underlying programmatic issues encompassing the Alyeska Maintenance program conducted at the various TAPS installation (i.e., not issuing Corrective Action Requests or Stop Work Orders), it commends their awareness of both the programmatic issues and their attention to detail in uncovering very specific issues identified during their audits:

<u>Quality Assurance Audit Report 92-A02 for Pipeline Operations and Maintenance, May 19, 1992:</u>

Finding No.: 1 Rev. 1, 4/10/92:

"(1) A maintenance manual does not exist for conducting corrective maintenance at pump stations.

"(2) An approved version of MS-31, Trans-Alaska Pipeline Surveillance Procedure and Monitoring Manual, does not exist.

"(3) Evidence does not exist to demonstrate manuals and SOPs have been reviewed annually as required.

"Discussion:

"(1) Currently SOP's are utilized for preparing equipment for maintenance and restoration of the equipment after maintenance. Although a very limited number of Standard Maintenance Procedure (SMP's) do exist, they do not address all corrective maintenance situations. A Maintenance Manual is necessary to satisfy the DOT requirement.

"(2) Three different preliminary versions of MS-31 have been issued since 1977. To date an approved version has not been issued. Work on this manual has been given a low priority.

"(3) Only the 1991 manual review request memo and responses were available in Engineering Document Control. Not all personnel responded nor was a time period identified for response."

Finding No.: 2 Rev. 1, 4/10/92:

"(1) Instruction on what manuals shall be kept and at what location was unavailable with the exception of SOPs.

"(2) Of a sample of 15 manuals located PS-8, three manuals in each location were found to have incorrect revisions. (See attached.)"

Finding No.: 3 Rev. 1, 4/10/92:

Contrary to the Requirements of 49 CFR Part 195.428(a):

"(1) Valves 39-PICV-104 and 31-PICV-105 had a scheduled

inspection of 9/28/88 which was not performed until 1/14/89, violating the 15 month and calendar year requirements.

"(2) Valve 32-PICV-204 had no calibration or inspection performed since 12/27/90 violating the 15 month and calendar year requirement. Valve 32-PICV-205 has a 19 month testing span in calendar year 90-91 (2/13/90 thru 9/30/91).

"(3) Valve 40-PSV-1004 has a 21 month testing span between calendar year 89-91 (6/23/89 thru 3/1/91). No inspection was performed during calendar year 1990.

"(4) Valve 40-PSV-1039 has a 17 month testing span between calendar year 89-90 (6/26/89 thru 11/19/90). No inspection was performed during calendar year 1991.

Discussion:

"Department of Transportation required inspection and testing of overpressure safety devices are not being consistently completed in the required time frame at all pump stations."

Finding No.: 4 Rev. 1, 4/10/92:

"A review of the records revealed that some station rectifiers at PS 1 through PS 4 have been checked less than six times per year required by code. Additionally, the frequencies of the checks have exceeded 2.5 months in many instances.

Discussion:

"The pump station rectifiers are checked periodically. The documentation does not support that each rectifier was checked six times during 1991. Time periods exceeding 2.5 months between checks were common."

Finding No.: 5 Rev. 1, 4/10/92:

"Interference bonds have not been checked regularly at PS 1 through PS 4 as required by code."

Discussion:

"No program is currently in existence to check interference bonds. Plans are made to begin checking these devices."

Finding No.: 6, 1/27/92:

"No documentation was available to verify that pipe sections adjacent to replaced or sleeved pipe had been inspected to determine the extent of the corrosion."

Finding No.: 7, 4/10/92:

"(1) No documentation was found to verify that the pump station supervisors' knowledge of the procedures 'established under 49 CFR 195.402' was reviewed as required.

"(2) No formal training program exists for the P&CM Supervisors on the Pipeline Surveillance Procedure and Monitoring Manual, MS-31, and no documentation exists to confirm that the procedures 'established under 49 CFR 195.402' were reviewed as required."

Quality Assurance Audit Report 92-A06:

Finding No.: 1, 9-28-93:

"Corporate Safety Manual (SA38) is not being complied with in the . . . areas" of:

inspection of all fork lift vehicles;

maintenance record and calibration card on file for each portable detector;

maintenance, calibration, cleaning, and testing of portable gas detectors;

calibration of pipeline detectors and Terminal detectors;

identification, inventory, inspection and record keeping of slings;

defining of criteria in PM Procedure for inspection and any required considerations for application of each type of sling;

covering of below-the-hook lifting devices in a separate PM procedures; and

identification by Department Manager of PMs critical to fire, safety, and health, and priority scheduling via PM System.

Discussion:

"Supervisors interviewed stated that no prior check of fork lifts was required before use.

"Portable gas detectors not tracked by the PM system are not being calibrated or records being maintained.

"Not all areas have procedures in place to check portable gas detectors with test gas prior to use.

"No procedures exist requiring annual calibration of portable gas detectors by OSF.

"Facility managers do not have inventories, or records of slings.

"There is no documentation of load tests, identifiers, or inspection of slings.

"There are no PMs particular to each type of sling.

"There are no PM procedures for "Below-the-hook" lifting devices.

"Supervisors stated that no priority is given fire, safety and health PMs. All fire, safety and health PMs are not identified."

<u>Finding No.: 2, 9-29-93:</u>

"Contrary to the above [listed requirement], a properly reviewed and approved Preventive Maintenance Manual does not exist.

"Contrary to the above [listed requirement], no written procedure has been developed to limit and define authorized personnel that may have access to the PM system.

"Contrary to the above [listed requirement], Preventive Maintenance inspection requirements, acceptance

criteria, and test procedures have not been developed by Engineering.

Discussion:

"There is no systematic means of identifying what items should be included in the PM system.

"The PM Administration can make changes to the PM tasks with no management or engineering review or approval.

"Inspection requirements and acceptance criteria are missing from many PM task descriptions."

Finding No.: 4, 9-28-93:

"Contrary to the above [listed requirements];

"pressure relief devices in the compressor station are tested on a two year cycle;

"all remote control shutdown devices are not included on the yearly PM;

"pressure relief devices at pressure limiting stations are tested on a two year cycle;

"relief capacity has not been documented annually.

Discussion:

"Annual gas building PM requirements are different at some sites than others for the same type of equipment."

Finding No.: 5, 9-28-93:

"Contrary to Alyeska's response to ARCO Finding #2E, Operations has not developed a system of secondary review of all changes to the PM task specifications.

"Contrary to Alyeska's response to ARCO Finding #2D, Alyeska Operations has not developed a written procedure addressing PM change requests.

"Contrary to Alyeska's response to ARCO Finding #2F, the Valdez Marine Terminal has not identified all regulated equipment, or included this information in the PM

system.

"although Pipeline has identified all DOT related PM tasks, ARCO Finding #2F states: 'Tasks in the PM system which satisfies regulatory requirements have not been fully identified.' Therefore Pipeline has not complied with ARCO Finding #2F until all regulatory requirements are identified."

Finding No.: 6, 9-28-93:

Regarding Requirement: "United States Department of Transportation Final Order CPF No. 52508, dated 6/21/93, quotes Alyeska as stating the following: 'Alyeska's PM waiver policy led to the missed inspections of these over pressure Safety Devices. As a result the waiver program has been revoked.'

"The PM waiver program has not been revoked at the Valdez Marine Terminal.

Discussion:

"The following PM tasks were waived at the Valdez Marine Terminal:

"Task 187643/Y01, Tag Number 52-LS-5261A, opened 7/1/93;

"Task 187643/Y01, Tag Number 52-LT-5262A, opened 7/1/93.

Recommended Action(s):

"The Manager, Terminal, ensure that the PM waiver program is immediately and permanently revoked."

Finding No.: 7, 9-28-93:

"Documentation of training for maintenance personnel on specific preventive maintenance tasks could not be located.

"No documentation could be found that supervisors maintain a through [sic] knowledge of the PM maintenance procedures for which they are responsible.

"No documentation could be found that maintenance employees have been trained in the hazards of the process and the procedures applicable to the employee's job task.

Discussion:

"Technicians' training records were reviewed, but no documentation of training on preventive maintenance tasks was found.

"None of the supervisors interviewed have been trained in the specific PM tasks for which they were responsible to insure compliance.

"Maintenance personnel working in PSM covered areas have not been trained in the hazards of the process and maintenance procedures."

Finding No.: 8, 9-28-93:

"Some completed PM tasks for Area 77, Valdez Oil Spill Contingency Equipment, are not complete, legible, accurate, signed, and dated.

"Some completed PM tasks for Pump Stations 10 and 12 also are not complete, legible, accurate, signed, and dated.

Discussion:

"Some examples of inconsistencies with completed PMs are:

"VMT Preventive Maintenance Task 190600/M01, Tag Number 19-Marco-#2864, completed 5/28/93, has the following inconsistencies:

"1. estimated time to complete the task is 2.0 hours, but actual time recorded was 1404.23 hours;

"2. actual hours entered into the computer data base was 2.0 hours, not 1404.23 hours as indicated on the PM completion form;

"3. the Technician's initials and employee number were not entered on the PM completion form.

"VMT Preventive Maintenance Task 190600/M01, Tag Number 19-Marco-#2864, completed 4/5/93, has the following

inconsistencies:

"1. estimated time to complete the task is 2.0 hours, but actual time recorded was 1369.15 hours;

"2. the Technician's initials and employee number were not entered on the PM completion form.

"Pump Station 12 Preventive Maintenance Tasks 161105/M01 and 141105/M03, Tag Number 45-MLR-01, were not signed by the supervisor on the June 1993 task completion record."

The Alyeska QA audit findings and discussion further emphasize the deficient condition of the maintenance program.

I. Pipeline Calibration Program (Pump Station Nos. 1, 6, and 10 and the Valdez Terminal).

The non-metering calibration programs being conducted at the pump stations and the Valdez Terminal are inadequate. The calibration facilities themselves are inadequate from the aspects of: space, organization, storage, segregation of materials, humidity and temperature control. In addition, these facilities demonstrate an extreme lack of care in maintenance and cleanliness. The gauges (secondary standards) used to calibrate pressure instruments are themselves not calibrated. The secondary standards utilized to calibrate permanent plant equipment in the pump stations or the terminal are not identified on the calibration records for the instruments/devices calibrated. There is, therefore,

no traceability to the specific secondary standard utilized to calibrate instruments that are essential to safe operation of the equipment. Consequently, there is no way to assess the impact of an out-of-calibration device, nor the extent of any such impact on the safe operation of the facility. Improperly calibrated equipment essential to the operation of the facilities could adversely affect the health and safety of the public, and the environment/ecosystem.

Imminent Threat

The deficiencies cited in the maintenance program represent a Class 2 imminent Threat. They are capable of causing severe injury, loss of design safety margin to a level below approved design, and indeterminacy of design safety margin for select parts or components of containment systems or systems important to containment.

XI. A.2 AS-BUILT CONFORMANCE

Introduction and Commentary

As reported else where in the report, because of the audit team's inability to inspect selected components to the as-designed configuration due to the lack of as-built drawings, or inadequate/incorrect as-built engineering drawings; the audit team expanded their inspections to include the general as-installed/as-maintained condition of the facilities visited.

The audit team requested responsible and knowledgeable Alyeska personnel to guide/accompany audit team members as they inspected each facility. This request was consistently made by the audit team and totally supported by Alyeska on-site management. This joint effort resulted in Alyeska being completely aware of the audit team's questions, inspection techniques, and inspection results.

This effort also assured that Alyeska would be able to respond completely to the audit team's findings contemporaneously and either resolve the condition on-the-spot, investigate the situation and get back with the audit team with verifiable resolution, or to document the condition(s) for further corrective measures.

General Audit Results

The general results of the audit team's inspections are as follows:

It became very clear very quickly to the audit team how Alyeska, once operation began in 1977, could achieve the through-put record of over nine billion barrels of oil being pumped from Prudhoe Bay, along eight hundred miles of challenging Alaska conditions, to the Valdez Marine Terminal. It is, in very large part, due to the talent, experience, and dedication of the work force manning the pump stations and the Valdez Marine Terminal. Similar strengths of a lesser magnitude were also identified in the support functions located in Anchorage. The audit team considers this as-found condition to be the most meaningful strength encountered during its visit.

As-found Conditions - Pump Station No. 1

Maintenance and housekeeping of electrical systems and cabinets were poor. The doors of the six (6) electrical safety system cabinets in the battery charging room were left open. When questioned about this observation, the Alyeska representative responded that it was necessary due to

the lack of cabinet cooling/ventilation. If the doors were closed/locked, it causes electrical circuit problems/failures, especially in the HSTP cabinet which contained an array of printed circuit boards sensitive to heat.

Spare parts/equipment are stored inside the operating electrical cabinets (e.g., spare modules, spare battery with a metal case stored on Ground Fault Detector. Two (2) cabinet grounds in the Gas Monitoring System cabinet were cut off and the pigtails left sticking up in the cabinet. Five (5) cable bundles were also cut off, left loose in the cabinet, with exposed spade lug terminations left loose which could come in contact with live terminations on adjacent terminal strips.

Housekeeping was extremely poor. Much of the dirt and debris was certainly due to the doors being left open. It became an easy, accessible place to store items. The Fire Alarm Panel contained strips of stiff metal propped in the cabinet. Cables entering several cabinets were improperly secured/dressed.

There was an add-on jumper wire installed between TB4-20 and TB22-6 that was not shown on the panel drawing. Research

discovered that it was a ground that did not create a problem (drawing called for a ground which was installed at the top of the terminal boards) to the operation of the panel, but there was no knowledge or authorization for the wire to be installed.

Generally, both mechanical (e.g., pumps, valves, pipes) and electrical equipment (e.g., cable trays, conduit runs, instruments, meters, gauges, motors) lack proper identification. There are isolated instances where an instrument gauge will be permanently identified, some are identified by pencil under the gauge as to its function (e.g., temperature, pressure, voltage); however, this is the exception rather than the rule.

Instrumentation line slopes at several locations exhibited a negative slope which can create incorrect operation/measurement reading of instruments and control system.

Many of the cable trays are overloaded, some as much as 250%. Cable softeners (protectors) are often not in use where cables enter/leave cable trays and cross over sharp metal rails.

The majority of cables are not secured in the cable trays.

Cables are routed outside cable trays and tied directly to threaded rods holding cable trays.

Threaded rods were identified that are hard-up against conduit runs.

There is a general lack of key control and locked cabinets in the majority of electrical cabinets. The keys were left in the RICWIL Panel which operates a controlled switch function.

Several threaded rods were left hanging in place directly outside the battery room. These abandoned hangers (several feet long) were apparently a result of cable trays that were removed for a modification to the electrical system.

The Primary Generator 31-G-1AT contained oil-soaked cloth absorbents left in the unit. Tools were left on the lid of the battery charger. Drill shavings were present on the battery charger plex-i-glass lid.

Equipment/tools were left abandoned around unprotected batteries/battery chargers.

Oily rags were left stuffed in the operating Primary Generator 218-31-B-1B. Loose metal washers were also observed and recovered from the unit.

Only one (1) bolt secures the right side flange to the housing for fan C9-55 in the Generator Room (there are several abandoned holes). The left side has five securing the unit.

Lifeline Generator 31-G-2AT had a piece of oil-soaked felt left at the bellows inlet flange. The oil pressure gauge is only partially filled with oil. Moisture beads were observed on the inside face of the gauge. Alyeska technicians could not answer what the minimum amount of oil was required for those gauges requiring oil. The P.M.'s also did not include information as to which gauges required oil and how much was required.

The "On" light for Lifeline Generator G51-LLTG #2 was not functioning. The concrete slab for the generator

was cracked at approximately two (2) foot intervals along the entire base of the unit.

Nine (9) boxes of computer paper awaiting recycle were stored in the Lifeline Generator room.

A mock troubleshooting exercise was conducted in an electrical cable/circuit. One cable in a bundle of several leading to Motor Control Center MCC #5, Frame 7 was selected. The technician acquired the proper permit and attempted to locate the cable and the wires contained in the cable. The cabinet was opened and the cable physically located. Neither the cable nor the wires were physically identified as to the cable number, the wire numbers, where the wires were to be landed/terminated, or where those wires were terminated at the other end of the cable. The technician located the ends of the wires by tracing them hand-over-hand through two other bays of the MCC. The terminal board number and the individual numbers of the terminal board where the wires were landed were located. The technician then left to locate the drawing for that MCC. The cable turned out to be a redline change which was not identified by a specific design change number or a project. The engineer responsible for the change signed and dated (3/28/93) the redline change.

It took almost an hour-and-a-half from the time the technician obtained the permit until the drawing was located.

As-found Conditions - Pump Station No. 6

The Garret Life Line and Primary Generators were inspected and the P.M.'s reviewed. The generators were well maintained and lacked any of the observations of oil/oily rags/debris identified at PS-1.

The acoustic monitoring Leading Edge Flow Meter installation next to the access road to the pump station installation is improperly installed in the mainline pipe. The instrumentation tubing leading to the top of the pipe was totally unsupported. The rest of the instrumentation tubing is improperly secured to the mounting stand (cocked and negative slope). The access road is slightly sloped in the direction of the mainline pipe and joins with a steep slope that presents danger to the sensor installation, especially in severe weather.

The audit team found an abandoned Data Logger which is used by Operations personnel to electronically verify and record the status of the Pump Station during their rounds. The Data Logger was left on a transformer next to the Bunker Heater/Emergency Lighting Panel.

As-found Conditions - Pump Station No. 10

The findings of the audit team at Pump Station No. 10 were consistent with those at Pump Station Nos. 1 and 6.

AS-BUILT DRAWINGS

As-built drawings are required in order to graphically define the approved engineering design definition for construction, maintenance, and operation of the TAPS. These drawings for systems, components, and structures once qualified by engineering analysis and test, and verified as reflecting, by inspection and test, the as-built configuration, become the basis for maintaining the integrity of those systems, components, and structures, thereby protecting the health and safety of the public, and the environment/ecosystem.

The audit team, therefore, planned its vertical slice audit approach to verify the status and integrity of the TAPS at Pump Station Nos. 1, 6, and 10, and the Valdez Marine Terminal around compliance to the as-built drawings by Alyeska for those items of hardware included in mechanical, electrical, and civil vertical slice application.

Locations

As-built drawings and the as-built drawing program were reviewed by the BLM/QTC audit team at the following locations:

- Pump Station No. 1,
- Pump Station No. 6,
- Pump Station No. 10,
- Valdez Marine Terminal, and
- Anchorage.

Audit Results

The audit team encountered confusion over the term "as-builts." The term applied at the pump stations described a process whereby drawings are physically marked up (usually with colored pens) for later incorporation into the drawing system. These marked-up drawings are then referred to as the "as-builts." Once these mark-ups are entered into the drawing system, the revised drawings are no longer referred to as "as-builts."

The term was also used to describe the drawing system after a construction or modification process has installed or modified components, systems, or structures per the design drawings, and the design drawings have been revised to reflect controlled deviations made during the installation or modification process. The drawings are then said to reflect the "as-built" condition, and are referred to as "as-built" drawings. This is also the description used in this section

of the report unless noted otherwise. (NOTE: This drawing type is referred to as Station Master drawing in the Documentation section of procedure N-2.00.03.)

The audit team identified the following strengths pertaining to as-built drawings:

The more complex the system configuration, the more important the role of as-built drawings. Some of the most complex systems are in the area of instrumentation and control. The instrumentation technicians at the Valdez Marine Terminal, recognizing the need for accurate system configuration information, have as-built a few of their more complex systems utilizing computer-aided design software. Their recognition that this information is necessary and their diligence in developing it is viewed as a strength by the audit team.

The audit team also noted a strength during its inspection of the Instrument/Metering Department (I/MD) at the Valdez Marine Terminal (VMT). The I/MD technicians took it upon themselves to develop a computer-aided drawing capability to compensate for the lack of correct as-built drawings for the electrical systems which they are responsible to maintain. The department developed the process to initiate the

drawings they require to perform their daily work tasks. The technicians manually tracked wires and developed computerized as-built wire lists that correctly define the as-built condition of the hardware (e.g., for the Ballast Water System), even though the software is not user-friendly. The audit team noted that the technicians did not have software training available and spent several hours learning the software to develop the drawings required. It was also noted by the audit team that this knowledge is retained by a few select individuals and there is concern among the technicians that impending layoffs, transfers, or early retirements will affect their abilities to continue this level of effort which will ultimately affect the safety of the facility.

The audit team identified the following areas of concern, that when taken collectively, indicate a breakdown in the as-built drawing program:

QA-36, Revision 7, Section 8.1, General, states:

> "The document control process ensures that controlled documents such as instructions, procedures, <u>drawings</u>, and specifications <u>are reviewed for accuracy</u>, approved for use, controlled, <u>and distributed to locations where work is performed</u>." (Emphases added.)

Since the document control process requires drawings to be reviewed for accuracy, it directly indicates drawings are to be accurate. Also drawings are to be at locations where work is performed. The drawings at field locations, the pump stations and the terminal, are in general non-compliance with Section 8.1. With few exceptions, they do not accurately denote the configuration of components, systems, and structures. In interviews with site personnel, there was a common theme expressed that the drawings available were inadequate to perform daily work and inspection activities and did not reflect the hardware configuration. The review by the audit team likewise indicated that the "as-built" drawings utilized at the facilities visited/audited do not adequately or accurately represent the installed hardware configuration.

The field drawings were inadequate when an attempt was made by the audit team to verify that commodities correctly reflect the as-built design. This verification method was accomplished by identifying specific commodities in the field, then attempting to locate the commodities on the drawings. This method failed, and there is a general indeterminacy or nonconforming condition as to whether the TAPS hardware as presently installed meets

the regulatory and engineering design requirements. This finding by the audit team was repeated at all pump stations audited.

The field drawings are also inadequate to allow verification that changes from the original design were properly reviewed, approved, implemented, and adequate. The method by which the engineering department issues changes (primarily through modifications called projects) appears to entail appropriate engineering design considerations, at least at this point in time. However, this design change process lacks the discipline required to effectively result in a controlled drawing system.

The field drawings are inadequate to verify that seismic and other stress calculations associated with harsh conditions are appropriate. However, engineering does have such calculations, including seismic and cold weather test data, for select components such as motor-operated valves. The data reviewed appeared adequate,
as was generally the case for vendor-supplied equipment. The difficulty is that there is no way to assure that these calculations are adequate for other components, systems, and structures, due to the breakdown in the drawing program.

Additionally, the field drawings were found to be inadequate in determining:

piping supports and restraints location, identification, type, and configuration;

pipe welds location, identification, and conformance to welding symbols;

pipe location, size, configuration, component location, valve weight, and valve orientation;

conduit and cable trays location, routing, supports, fire separation and isolation, and identification;

electrical cables routing, identification, tied isolation, and separation; and steel structure assembly configuration, joint location and joint orientation.

Two examples of the detailed review performed follow:

1. **Pipe Supports**

Weld quality was compared to the American Welding Society illustrations of acceptable and defective weld profiles for arc and gas welding. Drawing D-P-0688-M111, Rev. 0, dated 4/27/84, was used to verify the type and configuration of the supports and the welding requirements. There was no way to assure that the drawing was used or required to be used for the particular supports reviewed. The

drawing was used because the physical support configuration matched that called for by the drawing.

After observing approximately 20 piping supports in various locations at Pump Station No. 10, it was apparent that supports are not typically identified with any permanent piece marks or other forms of identification. (Similar findings apply to the other three field locations.) A review of as-built drawings at Pump Station No. 10 failed to reveal any that showed piping support specific detail, piping support typical details, or piping support locations. Site personnel were queried and asked to assist in finding such drawings.

After approximately a day, drawing D-P-0688-M111, Rev. 0, dated 4/27/84, titled "Pump Station #10 Pipe & Actuator Support" was found. This drawing had typical details for a U-Bolt Angle small bore pipe support (small bore pipe is typically pipe 2" or less in diameter) and U-Bolt Angle actuator support. The drawing had no material specifications for any of the support components (welding rod, U-bolts, steel angle). Neither did the drawing have any location or system identifiers on it.

An employee recalled seeing some of these supports in the topping unit. Review of the area showed several supports with the drawing configuration which had been installed on the naphtha fuel lines. Two supports were chosen. The basis of the choice was so that the supports could be easily identified relative to other in-place piping and equipment. When asked, the employee indicated there was not a way to find or know if installation documents existed for the two supports.

The first was supporting the naphtha fuel return line to valve V107 for main line unit No. 2. The typical detail from the drawing called for a 3/16" fillet weld all around the junction of the angle and existing beam. The weld was on the outside of the angle only, contrary to the call-out on the drawing. The weld had a poor profile: varying in leg size and concavity, the base material was undercut, there was overlap, and there were several arc strikes on the base metal. The weld was in the overhead position. The poor quality of the weld calls into question the qualification of the welder and the adequacy of the inspection function, if any was used on this weld.

The second was supporting the return fuel oil line from valve V104 for main line unit No. 2. The typical detail from the drawing called for a 3/16" fillet weld all around the junction of the angle and existing beam. The weld was on the outside of the angle only, contrary to the call-out on the drawing. The weld had a poor profile: varying in leg size and concavity, the base material was undercut, there was overlap, and there were several arc strikes on the base metal. The weld was in the overhead position. The poor quality of the weld calls into question the qualification of the welder and the adequacy of the inspection function, if any was used on this weld.

Since there was no identification on either of these supports, and no installation documents available, there was no way to verify material traceability of the weld rod, angle, or U-bolt assembly. Likewise, there was no way to verify the welding specification, welding procedure, welder qualifications, or inspector qualifications. These elements remain indeterminate for the two supports.

The configuration of the pipe support as relayed by the drawing does not appear to have been considered for seismic analysis. The length of the angle would be required to determine seismic or live-loading requirements as well as

the location of the support relative to the piping run. The detail from the drawing calls for the load (U-bolt and pipe) to be installed at the far end of the angle and the length of the angle is to be specified by the field. Since no as-built drawings were found for this installation, it is unlikely that engineering reviewed the installation for seismic considerations or performed a seismic analysis.

Pipe Support Deficiencies

Deficiencies found in the pipe support review include:

support identification,

weld quality,

welder qualification,

material traceability,

possible seismic design inadequacies, and as-built drawings.

Imminent Threat

While one can argue that the drawing used to review the supports may not apply to the supports reviewed (see above), that does not affect the portion of the review showing the lack of support identification, poor weld quality, inadequate welder qualification, lack of material traceability, or lack of as-built drawings. It does affect the seismic design

inadequacies portion, since the supports may have been installed to a drawing and procedures assuring such or there may have been a justifiable review indicating that seismic analysis was not required.

Based on this portion of the review addressing pipe supports, the lack of as-built drawings qualifies as a Class 2 Imminent Threat. It is a deficiency such that, if left uncorrected, it could adversely affect the safe operation of the project, particularly in an emergency condition. It is a threat capable of causing indeterminacy of design safety margin for components of containment systems.

2. **Electrical Contactor**

At Pump Station No. 10, an electrical contactor was selected for examination in order to verify the configuration, maintenance data, and other documentation for adequacy as well as how current the data was. The audit team requested the assistance of an electrician so that the review would comply with standard operating procedure and be in full accord with the authorized procedures. The electrician obtained a work order and made himself available to support the audit.

The selected contactor was TFP#2. Its function is to enable the station control operator to operate Turbine Fuel Pump Number 2 (TFP#2). The contactor is contained in Master Control Center 1A (MCC1A). Since the audit team did not want to disturb the operation of the pumping station in any way, the control circuit fuse was selected as the specific item to be checked. On request, the electrician took the audit team to the drawing files to find the value of the control circuit fuse in TFP#2. The team tried to use the aperture cards without success, then asked for the electrician's help. He explained that he used another method for his work, so he was asked to locate the fuse rating. He located drawing number D40E34, sheet 1, where SA-38, revision 2, calls for an amperage value of 2 amperes.

The electrician then took the team to master control center, MCC1A, where he aided in locating TFP#2. At the team's request, he opened the panel and pointed to the fuse. The fuse was marked KTR-5, which appeared to be a five-ampere rating. The electrician confirmed that the fuse was a five-ampere value. Because of the difference between the drawing call-out and the in-place value, the

team asked that another panel be opened. TFP#1 was examined and again the fuse was rated five amperes and the drawing called for two amperes. A third examination was made, this time on P37NE (used to control a part of the heating and ventilating system) where a one-ampere fuse was found. The drawing call-out for this fuse was checked, and drawing D40E29, sheet 6, called for a one-ampere fuse, the value that had been found in the contactor.

The differences identified on the five-ampere fuses set the electrician to thinking. He remembered that there had been some minor problems with the control circuitry for the fuel pumps, particularly because the control lines were long. He thought there had been a modification that increased the fuse ratings from 2 to 5 amperes, but he did not have any way to check the change authorization. The team terminated the reviews at that point with the conclusion that the drawing and configuration systems were not maintained current, and in that regard they were rated deficient.

Electrical Contactor Deficiencies

Deficiencies found in the electrical contactor review include:

as-built drawings, fuse value used not in accordance with the drawing call-out.

Imminent Threat

This deficiency is not severe enough to be rated as an imminent threat.

As-Built Drawing Conformance Deficiencies

Most of the as-built or field drawings reviewed do not adequately or accurately reflect the current configuration of components, structures, and systems.

Imminent Threats

In addition to the threat noted in the section on Pipe Supports, the overall as-built deficiency is a Class 2 Imminent Threat. It is a deficiency, such that if left uncorrected, could adversely affect the safe operation of the project, particularly in an emergency condition. It is a threat capable of causing indeterminacy of design safety margin for components of containment systems or systems important to containment.

XI. A.3 MEASURING AND TEST EQUIPMENT

Section 14.1 General of the QA Manual states:

> "Control of measuring and test equipment is necessary to ensure that characteristics of items or systems requiring measurement or test are within the specified tolerances.
>
> "The Manager, Oil Movements and Operations Support, is responsible for the measuring and test equipment control program and shall develop, implement, and maintain documented procedures to identify, calibrate, and control measuring and test equipment which requires periodic calibration. The program shall also include equipment used by Corporate Fire and Safety, Environment, Oil Spill and Contingency and SERVS."

Section 14.3 Usage of Measuring and Test Equipment states:

> "Each user or custodian shall ensure that the calibration of measuring and test equipment used is current.
>
> "Each user, when using measuring and test equipment to accept work, shall note the identification number and calibration due date in the applicable inspection record, as required."

Location

The audit team reviewed measuring and test equipment at the following locations:

Pump Station 1,

Pump Station 6,

Pump Station 10, and

Valdez Marine Terminal

Audit Results

The audit team observed conditions which did not meet the requirements of Section 14, and placed the status of equipment calibrations into the category of indeterminate. Section 14 of the QA Manual is inadequate for several reasons:

It does not deal with the equipment that needs to be calibrated on the pipeline or at the ASIS level. It is clear that the technicians at the pump stations that absolutely perform the calibrations of equipment to secondary standards do not report to the manager of oil movements and operation support. They report to the pipeline management structure. Section 14 appears to be focused on the metering equipment and Valdez.

Some of the shortcomings that were visible on the pipeline itself were that the control of the instruments for calibration is inadequate, that calibration stickers are not used for the purpose of identifying that equipment which requires calibration, nor (when there are stickers) does it include when the expired due date is in effect. The storage of the test equipment is inadequate at all of the facilities. The facilities themselves where they do the calibrations on

the pump station equipment are inadequate from a housekeeping standpoint, and from a control standpoint. The procedures that are used are inadequate for the purpose. There is no ability to track what piece of equipment was calibrated by which secondary standard in the event that during calibration of the secondary standard it is determined to be deficient or out of calibration. Therefore, there is no way to go back and find out what was calibrated and to investigate the effect on the operation of the pipeline. This is true except in the area of the metering system. That system appears to be adequate.

In the calibration of pressure equipment, pressure gauges at the pump stations, the audit team found that the secondary standards used to calibrate those pressure gauges themselves were not calibrated.

Imminent Threat

The deficiencies cited represent a Class 2 Imminent Threat since they are capable of causing a loss and indeterminacy of design margin.

XI. A.4 MOTOR OPERATED VALVE (MOV) MAINTENANCE PROGRAM

Motor operated valves (MOV's) are used in a variety of applications where remote control of a piping system is required or preferred to manual control. These valves are capable of being opened and closed via an electrical motor attached to the valve. The range of motion of the valve "gate" is controlled by open/close limit switches and limit torque switches. The limit switches are mechanically triggered, generally, as the valve moves into the full open or full closed position. Limit torque switches are adjustable to respond to varying levels of mechanical resistance encountered as the valve operates. The limit torque switches are used to assure the valve has opened or closed completely, and to assure that the motor will not burn out if unexpected high mechanical resistance is encountered during the opening or closing cycle.

Maintenance on motor operated valves involves assuring the valve is properly lubricated, is not leaking, the valve limit and torque switches are properly set, and that the other electrical aspects are in order.

Location.

Motor operated valves and the associated maintenance program were reviewed by the BLM/QTC audit team at the following

locations:

- Pump Station 10, and the
- Valdez Marine Terminal

Audit Results

The motor operated valve maintenance program focuses on lubrication of, the smooth operation of, and the absence of leaks in motor operated valves. The program does not require the review or maintenance of the electrical components of the valves. The latter was where the main emphasis of the audit team's review was placed.

A. <u>MOV Maintenance Element and Deficiencies</u>

The maintenance program for these valves did not include:

A review showing that the torque limit switches supplied cannot demand a larger torque than the motor can supply.

A review showing that the valve operator motors are not under sized or marginally sized for their particular load.

A check for compatible motor size, voltage and full load and locked rotor amps. A check of overload relay and heater size.

A check of breaker size and breaker trip setting.

A check of the breaker functions.

In the case of Valve 20FL1, main turbine fuel shutoff, the locked rotor amps call-out was 2.5 amperes per the motor name plate. The breaker was observed to be set at 12 amperes, substantially above the 2.5 called for on the nameplate. The drawing called for the breaker to be set at 3 amperes. This deficiency requires correction.

Observation and discussion with Alyeska personnel indicated that MOV limit switches are indirectly checked when the valves are activated (stroked) during the PM procedure. During this process, technicians check for "smooth operation."

B. Operating Parameters

The audit team reviewed the acceptability of specific operating parameters for the valves selected. The first parameter was to determine if the torque switches supplied do not demand a larger torque value than the motor can supply. The original design/procurement specifications for the valves and actuators imposed the responsibility for assuring compatability of requirements between the valve and actuator

(including margins) on the respective suppliers. Submission of the resulting interface data (including performance testing data) was submitted to Alyeska for information only. None of this information was provided to the audit team on submittal of the technical valve packages. Therefore, the relationship between the torque switches and motors could not be determined.

The second parameter was to determine if the valve operator motors are not under or marginally sized for their particular load. This could not be verified since the suppliers' interface data would be required, but was not included in the technical valve packages. These valves have been in place and operating without noticeable defect for many years. This suggests that the motors are adequately sized for routine service. However, it does not indicate the status or magnitude of the design margin.

The third parameter was to determine if the electric circuit breakers protecting the MOV from receiving excessive current are not under or marginally sized; the magnetic trip

settings, if applicable, are based on motor maximum output, the thermal overload relays and heaters, and have been sized for the desired locked rotor tripping time. This item is also affected by the lack of information on motor current levels and design margins for breaker settings. Thermal overload relays were not used in any of the valves inspected. The actuator switches and motor starter are all provided with heaters, and all had the recommended fuse size installed.

C. MOV PMs.

The third part of the review focused on existing Alyeska PM's relating to motor operated valves. Step 001 of the PM for "Annual Lubrication of the Firewater MOVs" states in part as follows:

"001: Check valves for proper operation, observe for leaks.

"1. Grove Valves

"A. Check for valve stem leakage
"- To prevent stem leakage new packing must be inserted.

"Note: With valve in closed position remove vent plug and inject packing until fresh packing can be seen coming from vent hole.

"B. Replace vent plug

"C. Push power button on and stroke valve

"D. Check for smooth operation

"E. Listen for any unusual noise, vibration or binding.

"F. Operate valve manually, checking for smooth operation.

"G. Lubricate valve stem with Antiseize

"H. Grease zerks with Alyeska #9

"Give written comments on valve and valve operator condition and performance"

The sub-steps of Step 001 are not specific. Sub-step A. instructs to check for leakage. Leakage as used is subjective and not quantified. The note in sub-step A. is ambiguous. One cannot tell whether fresh packing is required if there is no leak. Sub-step B. suggests packing is required, leak or not. There is no instruction as to what to do if the packing fails to stop the leak.

Sub-step C. instructs the technician to "stroke" the valve. Stroke is not defined. The technician does not know whether to stroke the valve to full open/full close or some stroke in between. There is no instruction as to what to do if the valve will not stroke.

Sub-step D. is not specific and does not instruct what to do if operation is not smooth. Sub-step E. is a bit more specific, yet still not quantifiable. Likewise, it does not instruct what to do if noise, vibration, or binding is found to exist. Similar comments apply to F.

Sub-step G. calls for lubrication of the valve stem. This step also lacks specificity. The technician is not instructed to lubricate the stem as is, or as the valve is cycled from full close to full open. The latter instruction assures maximum lubrication, the former something less.

At the end of Step 001, instruction is given to "Give written comments on valve and valve operator condition and performance." Review of several PMs indicated comments were sparse to nonexistent. Where they existed, they were difficult to read or illegible.

Generally, the PM is inadequate to assure proper maintenance of motor operated valves.

Imminent Threat

The deficiencies in the MOV program warrant a Class 3 Imminent Threat classification since they are capable of causing indeterminacy of design safety margin for select parts or components of systems important to containment.

XI. A.5 PROCESS AND INDUSTRIAL SAFETY

The audit team, in its assessment of the progress made to date, has determined this effort to be a strength. The development of logical flow diagrams and training programs, modules, and methodology by the training department is outstanding. Although all facets of the process safety management (PSM) program have not been fully developed and implemented, the audit team is encouraged by this program's apparent total commitment to quality. During the audit team's interview with members of Alyeska management, there was considerable discussion that Alyeska may be contemplating enlarging the scope of the PSM program for additional TAPS activities.

The scope of the Alyeska QA program identified in paragraph 3.2.1 of the QA Manual states:

> "The quality program includes provisions to comply with *29 CFR 1910.119, Process Safety Management of Highly Hazardous Chemicals*, as applicable to facilities such as:
>
> "1. vapor recovery systems at Pump Station 1 and the Valdez Marine Terminal; and
>
> "2. topping units at Pump Stations 6, 8, and 10.
>
> "The provisions for process safety management include systems described throughout this manual, such as management responsibilities, design control, control of documents, audits, and training."

Paragraph 4.1 states, in part:

> "The environment and contingencies program provides a systematic approach to protecting the environment and ensuring compliance with environmental laws and regulations.
>
> "The Vice President, Environment and Contingencies, is responsible for developing, implementing, and maintaining the environment and contingencies programs including a program of field surveillance to verify compliance."

The audit team finds as deficient lack of involvement, interface, and control, of the Alyeska quality assurance program in the area of the overall environmental program. The audits conducted to date by the QA organization are shallow in scope and do not approach proper monitoring of the environmental and contingencies program in place and operating by Alyeska. The environmental organization appears to the audit team to be a "separate company" which does not come under the Alyeska quality assurance program.

An additional concern identified by the audit team was the planned reduction of the work force at some pump station locations (e.g., Pump Station Nos. 5 and 7), with no apparent coordination of the reduction in force vs. Alyeska's commitment to respond as required by the Oil Spill Contingency Plan.

The audit team, however, did find Alyeska's programmatic approach to meeting regulatory requirements and the implementation of those programmatic systems to be adequate.

XI. A.6 IDENTIFICATION AND TRACTABILITY OF ITEMS

Section 11.1 General of the QA Manual states:

> "Controls on identification and traceability of items ensure that only correct and accepted items are used or installed.
>
> "Items that affect pipeline system integrity, safety, or environment, shall be identifiable or traceable to the procurement, design, or other governing documents, as applicable, from production through installation."

Location

Pump Station 1,

Pump Station 6,

Pump Station 10,

Valdez Marine Terminal, and

Anchorage.

Audit Results

The audit team, in their inspection process, could not trace installed equipment to the purchase order of record. The Alyeska program does not require traceability past receiving inspection. The theory is, according to those interviewed by the audit team, that only accepted material (including the verification of certification and test requirements) is allowed to be released from receiving inspection for installation. Alyeska has not provided a program of ready retrievability for items of equipment that a vendor determines to be defective after shipment to the user.

Alyeska instituted its initial formal receiving inspection program that required the verification of material traceability in November, 1992, when the Interim Material Control program was issued. (See XI.B.14 for more detail.) Prior to its issuance, the status of the receiving function, and hence materials, was indeterminate. That's not to say that there were not pockets of materials procured throughout the project where adequate attention was paid to certifications, heat marks, and other required marks and documentation essential to traceability.

The current program is deficient programatically in procurement and receiving.

Imminent Threat

These deficiencies are classified as Class 3 Imminent Threat since they are capable of causing indeterminancy of design safety margin.

XI.B.1. QUALITY AUDITS AND SURVEILLANCES

Quality audits and surveillance provide independent and objective verification of quality system compliance and effectiveness in meeting regulatory requirements that protect the health and safety of the public.

Compliance to the Alyeska QA Manual, QA-36, Revision 7, was audited at:

Pump Station No. 1,

Pump Station No. 6,

Pump Station No. 10,

Valdez Marine Terminal, and

Anchorage.

The quality audit and surveillance program (hereinafter referred to as the monitoring program) is very narrowly focussed to specific project activities and isolated programmatic compliance areas. The monitoring program is not adequately staffed or chartered by its own program, to verify that the TAPS is in compliance with the operations activities necessary to control and maintain the TAPS in accord with regulatory requirements.

The Alyeska monitoring program reports were reviewed by the audit team for evidence that the TAPS organizations were in compliance with regulatory requirements essential to quality.

The audit team could not verify that the monitoring program was being conducted in accord with Section 18.1 "General" of QA-36, Revision 7, which states, in part:

> "[T]he Manager, Corporate Quality Assurance, is responsible for the quality audit and surveillance programs and shall develop, implement, and maintain documented procedures for the programs."

Since the QA program lacks specific operating procedures to control the audit process, the audit team was unable to verify that the ". . . [a]udit schedule shall be prepared. . . , and revised as necessary to ensure adequate coverage. Scheduled audits are supplemented by additional audits commensurate with the status and importance of the activities audited." (Emphases added.) (Reference section 18.2 Audit Schedule.)

These subjective statements, in the assessment of the audit team, should have required at least the scheduling of follow-up detailed audits (if not stop work orders) of Quality Services (QS) which is responsible for the TAPS inspection activities. Three (3) audits reviewed of QS defined basic

programmatic deficiencies which are basic to maintaining a disciplined and effective inspection program.

Section 18.3 states that the "Audit Plan shall be developed for each audit in accordance with documented procedures."

It does not take into account any previous audits that were previously performed that might have an influence on this specific audit plan to see if there were weaknesses that should be revisited or corrective actions that the audited organization committed to, to verify that the corrective actions are lasting. It should be noted that the auditors state that previous audits are reviewed; however, that fact is not included as a reference in the body of the audit report.

Section 18.4 "Audit Personnel" states that: "The Manager of Corporate Quality Assurance shall qualify and certify auditors and lead auditors in accordance with documented procedures." It is not apparent to the audit team that these documented procedures exist, nor that the Manager of Corporate Quality Assurance has the qualification or the capability to make the qualification for individuals in lead

auditor status, at least in accord with normally recognized standards for auditors.

It also states in 18.4 that: "Auditors shall be independent of any direct responsibilities for the activities they audit." This raised the question to the audit team as to whether or not this applies to functional manager audits and surveillances, which are called out in other parts of this manual.

Section 18.5 "Audit Performance" does not address "observations." It does address documentation and recording of findings, but Alyeska QA also issues "observations."

Section 18.6 "Audit Report," which describes the segments of the report as including: executive summary; scope; auditor names; personnel contacted during audit; audit finding reports; and due date for responses to findings. Again, this does not address or allow observations.

Section 18.7 "Audit Response." Nothing in this section defines what the Manager of Corporate Quality Assurance does if or when he does not approve of responses from the audited organization. Also, this section does not include the

mechanism to elevate management levels for action if the responses are not timely, or if they are inadequate.

Section 18.8 "Audit Follow-Up Action" states that: "The Manager, Corporate Quality Assurance, shall verify that the corrective actions have been accomplished." There is no process or mechanism to verify that the corrective actions taken are adequate or lasting.

Section 18.11 "Audits by Outside Agencies" states that "Audits of Alyeska activities performed by outside organizations shall be coordinated by the Manager, Corporate Quality assurance." The BLM/QTC audit falls into this category in that it is an audit by an "outside organization"; however, Alyeska QA was not the audit team's interface nor were the audit team's activities "coordinated" by Alyeska QA. This coordinating activity by Alyeska is also not defined by an implementing procedure.

Section 18.12 "Tracking." Tracking is one thing, but trending is another, and although there is a requirement in Section 16 "Corrective Action" for trending of audits, no such trending is performed.

It was noted by the audit team that the Alyeska QA auditors were knowledgeable and effective auditors. However, they are only two (2) individuals tasked with auditing the total TAPS project for compliance to the QA Manual/TAPS requirements.

It was also noted by the audit team that responses and action by the audited organizations was slow and the implementation of corrective action was even slower. In the assessment of the audit team, this lacks a management commitment to quality by the timely resolution and prevention of conditions adverse to quality.

The audit team also discussed with the Alyeska QA personnel that some "observations" should have been "findings." Observations are only recommendations and do not require responses or corrective action by the audited organization.

XI.B.2. CORRECTIVE ACTION

Section 16.1 "General" of the QA-36 Manual, Revision 7, states, in part:

> "The corrective action program provides a systematic approach for taking action to correct problems and prevent or minimize recurrence."

Section 16.2 "Identification and Documentation" states:

> "System deficiencies identified in inspections, audits, and surveillance shall be evaluated. Corrective Action Requests shall be issued by the Manager, Corporate Quality Assurance, if the deficiencies are judged to be conditions adverse to quality."

Contrary to the above requirements of the QA manual, the following noncompliance was identified by the audit team:

> Corrective Action Requests (CAR's) have not been issued by the Alyeska QA organization in order to "correct problems or minimize recurrence." This lack of compliance was due to past management decisions reportedly at both the Alyeska senior and functional managers levels, even though significant conditions adverse to quality were identified by both QA audits and surveillance activities.

In the assessment of the audit team, Alyeska management has failed to make a commitment to quality which implements a lasting mechanism to preclude recurrence of conditions

adverse to quality. This has resulted in a breakdown in the QA program which is intended to form the basic framework for lasting correction of deficiencies, thus lessening the safety margin of structures, systems, and components. This loss of safety margin has a direct effect on Alyeska's ability to meet regulatory requirements which protect the health and safety of the public, and the environment/ecosystem.

XI. B.3 CORRECTIVE MAINTENANCE

The various TAPS work control/work order systems in effect by Alyeska, including: Pipeline Operations Work Order Reporting System (POWOR), MAXIMO, Trouble Tickets, and COMAC (used to support corrective maintenance at the pump stations, Supervisory Control and Data Acquisition (SCADA), Ship Escort Response Vessel System (SERVS)) were reviewed by the BLM/QTC audit team and it was determined that the existing programs do not have written implementing procedures for initiating requests for routine and emergency maintenance activities. This lack of programmatic control includes:

criteria and responsibilities for review and approval of maintenance requests, including emergency requests;

criteria and responsibilities for performing work activities;

criteria and responsibilities for performing inspection activities;

provisions and responsibilities for the identification of inspection hold points;

methods and responsibilities for identifying and performing functional testing following maintenance work prior to equipment being returned to service;

cause of the malfunction or failure which necessitated the maintenance work;

description of the corrective action taken;

identification of replacement parts or materials used;

identification of test and measuring equipment used;

and,

a program for reviewing completed corrective maintenance records to assess the adequacy of the preventive maintenance program, to identify repetitive failures and to identify design deficiencies which form the basis of developing a predictive maintenance program.

This programmatic breakdown represents a severe deficiency in the efficient performance of work.

Imminent Threat

These deficiencies are addressed as threats in the Maintenance section of this report.

XI. B.4 DESIGN CONTROL

The QA program does not interface with, nor audit, the engineering design control process. Design control is a very key element of a functioning and effective quality assurance program. The fact that this essential element of achieving compliance to regulatory requirements, engineering practices, and quality assurance provisions is absent from any QA oversight constitutes a Class 2 Imminent Threat.

The lack of a disciplined quality assurance program integral to design control is ever-present in the inspected status observed by the audit team. One of the most pressing concerns of the audit team is the ability of key systems to function during a seismic event. The seismic design control process to maintain the safety margin of critical equipment (e.g., electrical systems, cable trays, cables) once the TAPS became operational, broke down and as a result, the seismic integrity of the TAPS is indeterminate.

The design records files reviewed by the audit team did not include a comprehensive listing of the regulatory and design requirements that apply. Therefore, the audit team could not determine if the actual design was in compliance with regulatory requirements in place that protect the health and safety of the public, the environment, and the ecosystem.

XI. B.5 CONTROL OF DOCUMENTS

Paragraph 8.1 General, of QA-36, Revision 7, states:

> "The document control process ensures that controlled documents such as instructions, procedures, drawings, and specifications are reviewed for accuracy, approved for sue, controlled, and distributed to locations where work is performed."

Locations

Pump Station 1,

Pump Station 6,

Pump Station 10,

Valdez Marine Terminal, and

Anchorage

Audit Results

The document control process, as observed by the audit team, is fragmented, inefficient from a document retrieval standpoint, ineffective, and not an integral part of the Alyeska QA program.

A. Programmatic Breakdown.

The document control process has completely broken down in assuring that only approved drawings that accurately reflect the as-built configuration of the hardware comprising the TAPS are available at the various user locations (e.g., pump stations, VMT).

A further facet of this programmatic breakdown involves the lack of a comprehensive engineering definition listing of:

- a master equipment listing (MEL)
- a master equipment listing of the equipment included in the safety systems to be covered by the quality assurance program.

Document control does not maintain a program for the control of vendor manuals. Therefore, there is no assurance that engineering is using the latest vendor information in maintaining the TAPS equipment. Furthermore, since there is no master equipment list compiled for the TAPS, there is no assurance that engineering has identified all equipment requiring maintenance.

It is the assessment of the audit team that the issues identified by the audit team involving document control stem from the lack of an integrated QA program. Section 8 of the QA Manual does not require auditing of document control as a normal part of their program.

B. Unauthorized Changes to Drawings

Section 8. of the Alyeska Quality Program Manual QA-36, Revision 7, is entitled: "Control of Documents." Paragraph 8.1, "General," requires, in part, that:

> ". . . [c]ontrolled documents such as instructions, procedures, drawings, and specifications are reviewed for accuracy, approved for use, controlled, and distributed."

Paragraph 8.2, "Procedures," states:

> "Functional managers shall develop, implement, and maintain documented procedures for:
>
> "1. preparing, reviewing, approving, revising, and maintaining controlled documents;
>
> "2. maintaining lists of controlled documents;
>
> "3. maintaining controlled distribution lists;
>
> "4. transmitting documents to designated individuals with instructions requiring written acknowledgement of receipt and replacement of out-of-date documents; and
>
> "5. indicating the revision status of documents."

The audit team found that a consistent and organized approach to a document control function throughout the TAPS was non-existent. Document control is not centralized nor is it adequately coordinated through the various users/ functional managers. The QA manual provides for this disjointed approach to document control in paragraph 8.2.

Unauthorized changes to "controlled documents" such as P.M.'s, drawings, and manuals were identified to the various users/functional managers. As an example, the Vapor Recovery Manual - Pump Station System Information Manual (SIM) Volume 41, Controlled Copy serial number 11, Issue Date: 1 July

1992, contained several hand-annotated changes to criteria which could not be verified as to who initiated the change; who approved the change; why the change was necessary; or, the effect of the change on past activities affecting the Vapor Recovery System's ability to maintain its safety margin.

The audit team reviewed many drawings at Pump Station Nos. 1, 6, and 10, and the Valdez Marine Terminal. There were numerous instances noted where unapproved redlined changes were made to drawings, with no identification or dating. Changes were not identified in any documentation other than on the drawings themselves. There were no written procedures for the submittal of redlined drawings for new revisions.

C. <u>As-Built Configuration Exercise</u>

As-built configurations of the above-ground pipeline at mile 1.0 and mile 12.0 were requested so that the field conditions could be compared to the as-built configuration shown on the drawings.

The audit team requested appropriate Alyeska personnel to explain the control procedures for engineering documents.

In response to the request for the as-built configuration of the referenced locations, Alyeska transmitted orthographic photographs with a scale 1"=1000' which also showed a rough pipeline elevation.

In response to questions concerning Alyeska's document control, it was explained that there is no central collection point for maintaining documents. Engineering records are kept within the individual offices of the engineers responsible for the particular area for which the documents apply. There are no internal procedures for document control. Engineers come and go in the organization. Documents are invariably lost as a result. When an engineer is transferred between departments, the records are often taken with the individual or discarded. It was explained that prior to 1984 or 1985, there was a group within the company that was responsible for document control. The group was eliminated as a cost cutting move. The current situation has existed since that time.

The as-built drawings provided did not permit a comparison of as-built drawings to the field conditions.

Lack of a central control point for the maintenance of engineering documents is a serious problem. Since there are

no internal document control procedures, it is rational to assume that each of the engineers who maintain documents in their offices have a different procedure for doing so. Maintaining engineering continuity in an organization in a constant state of flux that has no document control is impossible.

D. Document Control Implementing Procedures.

In an attempt to determine, from a programmatic standpoint, who and how Alyeska meets the QA Manual (QA-36) requirement to review and control "instructions, procedures, drawings, and specifications," the audit team reviewed a sample of procedures in the document control section which implements QA-36 Section 8 and QS-92, Quality Standards Manual, Revision 0, Effective Date TBD (To Be Determined), Quality Standard No. 8.1, Revision 0, Effective Date 4/1/93, entitled: Control of Documents.

The implementing procedures supplied by Alyeska were as follows:

1. Document Control Procedure, dated: September 21, 1993, entitled: "Drafts and Revisions of pages in Manuals, Specifications, and Technical Bulletins" (3 pages);
2. Document Control Procedure, dated September 21, 1993,

entitled: "Assuring Compliance of Documents to Regulations (federal ROW [right of way], DOT [Department of Transportation] 49 CFR 195 (pipeline), 49 CFR 192 (gas line), 49 CFR 119 (OSHA), and Alaska state regulations (18 CCC 75, regulations implementing HB 567)"; and,

3. Document Control Procedure, dated: September 21, 1993, entitled: "Archiving Manuals Produced in VM Publishing."

Quality Standard No. 8.1, under paragraph 4.0, "Procedure," states, in part:

"4.1 Document Control System

"4.1.1. Functional managers who prepare or use controlled documents:

"(a) develop and maintain a departmental procedure in accordance with Quality Standard 2.2 that identifies the documents prepared by their respective departments and the controls to be applied. . . ."

Quality Standard No. 2.2, Revision No. 1, Effective Date 8/1/93, entitled, "Departmental Procedures Development," states, in part:

"1.0 PURPOSE AND APPLICABILITY

"This Quality Standard describes the process for preparing, reviewing, approving, and maintaining departmental procedures as required by Section 2 of the Quality Program Manual. . . ."

"4.0 PROCEDURE

"4.1 Procedure Preparation

"4.1.1 Department managers:

"(a) develop, implement, and maintain a procedure for their respective departments that defines specific requirements for:

"(1) procedure format;
"(2) review and approval;
"(3) training;
"(4) distribution;
"(5) periodic reviews; and
"(6) revisions; . . .

"(b) develop, implement, and maintain departmental procedures in accordance with the following provisions: . . .

"(5) The following *guidelines* apply to the preparation of new or revised procedures:" [emphasis in the original] . . .

"c. each procedure contains the following information as applicable:

"1. procedure number;

"2. procedure title;

"3. revision number;
"4. approval signature and date;

"5. effective date (cannot precede approval date);

"6. expiration date;

"7. purpose -describe what the procedure is intended to do, i.e. why it was written;

"8. applicability -identify the activities and organizations to which the procedure applies or conditions for use of the procedure;

"9. references -identify other documents that must be used in performing the work;

"10. procedures -identify the performers and procedural steps necessary to perform the work;

"11. inspection or acceptance -identify the work to be inspected and the qualitative or quantitative acceptance criteria, if applicable, for determining that important activities have been satisfactorily accomplished;

"12. method for documenting completion of activities; and

"13. records -identify data sheets, checklists, log sheets or other documents to be processed as quality records in accordance with Quality Standard 17.1. Records provide evidence of satisfactory work completion. . . ."

"4.2 Review and Approval

"4.2.1 Department Managers:

"(a) coordinate review of each departmental procedure with responsible individuals within the department and with the managers of other departments affected by the procedure;..."

Contrary to the requirements of the QA programmatic requirements, Alyeska has not developed implementing procedures which control the document control process. The document control program as envisioned and defined in the QA program manual and standards is shallow and deficient in establishing a comprehensive program. The emphasis is placed on controlling documents, which Alyeska has failed to accomplish, not on developing a disciplined, centralized, and coordinated document control function.

The three (3) documents supplied by Alyeska as implemented fail to meet any of the requirements established in either QA-36 or QS-92 as described above.

The document control activity presently implemented throughout the TAPS has failed to maintain either configuration control of the TAPS hardware or procedural control of vendor manuals, drawings, procedures, or instructions.

E. Document Control Audits.

The QA program has also failed to perform a dedicated and comprehensive audit of the Alyeska document control program over at least the past three-year period. This lack of programmatic audit of a vital aspect of the QA program is of serious concern to the audit team.

There was a document control audit (Quality Assurance Audit Report 91-PT-01, April 8, 1991) performed on Price/Northland and Williams Brothers during the Mainline Pipe Replacement Project P-4518, Atigun Reroute Project. As stated in the Audit Report, "Finding No. 04 was written to document Alyeska's lack of Document Control when issuing specifications to all affected parties, and distributing

copies of the Price/Northland Quality Control Manual to Williams Brothers."

It should be noted that the audit team was extremely impressed with the understanding and desires of the OMOS operations support document control supervisor to develop and maintain systems and controls to keep the various TAPS operating facilities informed with the most up-to-date information available which they require in order to maintain safe maintenance and operation.

Imminent Threat

The deficiencies cited warrant a Class 2 Imminent Threat since they can cause and have likely caused loss and indeterminancy of design safety margin.

XI. B.6 INSPECTION AND TESTING

Section 13.1 General of the QA Manual states:

> "The inspection and testing program ensures that items or systems important to safety, the environment, or the pipeline system receive appropriate inspection or testing prior to use and periodically during operation.
>
> "The Manager, Quality Services, or the functional manager is responsible for inspection, test, or status of items."

Locations

Inspection and testing personnel, practices and procedures were reviewed at the following locations:

Pump Station 1,

Pump Station 6,

Pump Station 10,

Valdez Marine Terminal, and

Anchorage.

Audit Results

The audit results suggest that the inspection and test functions generally are insufficient to assure that items or systems important to safety receive appropriate inspection or testing.

A. Inadequate QC Function

Alyeska's implementation of a quality control inspection program that is outside the independence of Quality Assurance

is the primary reason why the inspection status of the TAPS hardware, as inspected by the audit team, is indeterminate. A complex, high-tech project philosophy (such as that implemented by Alyeska) that does not rely on process control and independent monitoring to achieve safety and quality, but rather places the responsibility for quality on everyone performing work while providing inadequate instruction, training, and criteria, is destined to have an adverse effect on the health and safety of the public, the environment, and the ecosystem.

Section 13.1 on inspection and testing does not require QA participation at any level, and the controls identified are weak, which equates to an inspection program that is ineffective, and one which allows conditions adverse to quality to exist. Such is the present inspection status at the TAPS.

B. Adjunct Inspectors.

The audit team is also extremely concerned about the use of "adjunct inspectors" to determine the acceptability of hardware conditions which are essential to the health and safety of the public, the environment and the ecosystem.

It is the assessment of the audit team that adjunct inspectors were authorized for use by the Quality Services organization to meet specific schedule demands of the project. The use of adjunct inspectors therefore, in the assessment of the audit team, emphasizes cost and schedule over quality and safety. Alyeska management, in responding to the audit team's concerns regarding the use of adjunct inspectors, references Quality Standard 13.1, paragraphs (d) and (f) as the authority for the adjunct inspector program, which state:

> "(d) ensures qualifications and/or certifications of engineers assigned to perform Quality Services' inspection activities are reviewed and accepted;"
>
> "(f) ensures Quality Services' inspectors, including engineers or technicians assigned as inspectors, either employed by or contracted to Alyeska, are qualified and certified, when required, in accordance with department procedures;"

The audit team interviewed adjunct inspectors who were concerned that they were directed to perform acceptance inspections (electrical and concrete) for which they were neither qualified by previous experience or training in either the discipline or as inspectors, and were not provided specific inspection criteria with which to perform the inspections. Neither quality standard 13.1 nor Inspection Manual IS-47, Section 6, incorporates the criteria for

qualifying and certifying inspection personnel which would justify the use of instrumentation technicians as inspectors. This totally defeats the philosophy of independence from cost and schedule and from inspecting their own work.

In response to the audit team's concerns regarding adjunct inspectors, Quality Services Department submitted the following justification:

> "Alyeska's Inspection Manual IS-47 section 6 requires the review of Inspector qualification and certification, work experience, special training, and references as they apply to the inspectors field of expertise and the defined scope of work.
>
> "Personnel utilized as inspectors where inspection is not their primary responsibility are referred to as Adjunct Inspectors. These Adjunct inspectors are not any different from other inspectors utilized by Alyeska in regards to their qualifications and the indoctrination they receive to the Alyeska inspection policies and procedures. The adjunct inspectors are qualified Technicians and Engineers that are utilized on a limited basis to efficiently perform inspection. The majority of the adjunct inspection work is of an instrumentation nature which corresponds to the expertise of these inspectors.
>
> "The resumes of the potential adjunct inspectors are reviewed by the Quality Services Department prior to any inspection assignments. These inspectors then receive at least 8 hours of training covering proper inspection and documentation procedures. A total of 5 resumes were submitted for consideration as adjunct inspectors and of these 4 were accepted and completed the training program. The 4 adjunct inspectors are Electronic/Instrumentation Technicians.
>
> "The inspection work is not considered the primary responsibility for these adjunct inspectors. They have other technician duties and as such are only utilized in

special situations that match their expertise where a regular qualified inspector is not readily available. So far it has been estimated that Adjunct Inspectors have been utilized for only about 10 hours of inspection work.

"None of Alyeska's inspectors inspect their own work."

In response to the submittal by Quality Services Department, the audit team submits the following:

1. Alyeska's Inspection Manual IS-47 section 6 does not provide specific criteria that is used as the basis for accepting Inspector qualification and certification, work experience, special training, and references as they apply to the inspector's field of expertise and the defined scope of work.

2. There is a significant concern regarding the statement that "Adjunct inspectors are not any different from other inspectors utilized by Alyeska in regards to their qualifications and the indoctrination they receive to the Alyeska inspection policies and procedures." The adjunct inspectors interviewed by the audit team had <u>no</u> previous inspection experience, and the inspection policies and procedures did little to compensate for this lack of previous inspection experience, facts which they recognized themselves, and did not prepare them for the inspection tasks which they were assigned. Being

qualified technicians and engineers, no matter how limited the basis may be, and no matter how "efficiently" the inspection may be performed from a time and cost standpoint, does not assure that they can *effectively* perform inspections. The adjunct inspectors may not inspect their own work (although the audit team received allegations to the contrary which have not yet been thoroughly investigated), they do perform inspections on the specific project to which they are assigned.

The audit team has additional concern because of the wording of Section 13.3, Qualification and Certification of Personnel, of QA-36, Revision 7, which states, in part:

> "13.3.1 Quality Control Inspectors
>
> "Quality Control Inspectors shall be qualified and certified, *when required*, in accordance with documented procedures under the Alyeska quality program or under the contractor's quality program approved by Alyeska." (Emphasis added.)

The statement itself raises questions regarding the extent of experience, training, and qualifications required for quality control inspectors. When coupled with statements made to the audit team regarding the

lack (in some instances, the total lack) of previous inspection experience by some adjunct inspectors and the assertion that adjunct inspectors "are not any different from other inspectors utilized by Alyeska in regards to their qualifications and the indoctrination they receive to the Alyeska inspection policies and procedures," the concern is increased.

Inspection and Testing Deficiencies

The audit team views the inspection function and the adjunct inspection function deficient.

Imminent Threat

The deficiency is classified as a Class 2 Imminent Threat since it is capable of causing a loss and indeterminacy of design safety margin.

XI. B.7 MANAGEMENT CONTROLS

The audit team reviewed Alyeska's management controls over the functional areas identified in this final report with the following general results. Specific results are identified under separate headings included in the body of the report.

Alyeska has an accumulation of written programs consisting of policies, procedures, and instructions intended to provide guidance in the management of the functional areas. With the exception of specific dedicated tasks, e.g., welding, non-destructive examination, process safety management, the implementing procedures and instructions are generally inadequate, or non-existent, for defining and controlling the activities in the functional area to assure compliance with regulatory requirements and guidance.

The TAPS project lacks an integrated mechanism to identify, track, and incorporate regulatory requirements into governing Alyeska procedures and instructions. Therefore, the audit team, with the exception of select areas, could not verify that regulatory requirements were being met by the TAPS, as managed by Alyeska.

With few exceptions, individuals who have been assigned responsibilities in the functional areas have not been provided with specific or adequate job position descriptions or guides to assure that they understand and carry out their responsibilities. This lack of specific management direction, coupled with the general lack of definitive implementing procedures or instructions, does not assure that individuals performing in functional areas understand their responsibilities. Neither does it assure that functional managers have an understanding of:

1. what the regulatory requirements are for their functional area;
2. how those total requirements are integrated into the work force; and,
3. who in their functional organization is responsible for carrying out those requirements to assure protection of personnel, equipment, and the health and safety of the public, and the environment/ecosystem.

Imminent Threat

These conditions warrant a Class 1 imminent threat categorization. While the timeliness aspect is difficult to

assess, these deficiencies are capable of being the cause of death or severe injury, loss of containment and of oil, and loss of design safety margin.

XI.B.8. CONTROL OF NONCONFORMING ITEMS

Section 15.1 General of the QA Manual states, in part:

"Control of nonconforming items serves to prevent the inadvertent installation or use of items which do not conform to requirements."

Section 15.3 Identification and Segregation

"1. Nonconforming items shall be identified by legible and easily recognized marking, tagging, or other methods which do not adversely affect the end use of the items.

"2. If identification of each nonconforming item is not practical, the container, package, or segregated area shall be clearly marked.

"3. Nonconforming items shall be segregated, when practical, in clearly identified and designated holding areas until the items are properly dispositioned."

Section 15.5 Corrective Action states:

"The responsible manager shall ensure that corrective action is taken in accordance with the disposition."

Section 15.7 Tracking of Nonconformance Reports states:

"The Manager, Quality Services, shall develop, implement, and maintain documented procedures to identify nonconformance reports and track their status to ensure corrective actions have been completed and verified. The tracking system shall include nonconformance reports which were not validated."

Section 15.8 Analysis of Nonconformances states:

"The Manager, Corporate Quality Assurance, shall perform analysis of nonconformance reports to detect adverse or improving trends in quality."

Audit Finding

The audit team has determined that the Manager, Corporate Quality Assurance, is in noncompliance with Section 15.8, Analysis of Nonconformances. The Manager has failed to analyze the nonconformance reports to "detect adverse or improving trends in quality" and the nonconformance program does not provide for issuing such a report. The audit team considers this lack of hardware and programmatic awareness by management and its lack, therefore, of detecting adverse trends that represent conditions adverse to quality, to be a key breakdown in the quality assurance program in meeting regulatory requirement and protecting the public health and safety and the environment/ecosystem.

The audit team has determined that the Manager, Quality Services, is in noncompliance with Section 15.7, Tracking of Nonconformance Reports. The Manager has failed to incorporate any provisions in the Quality Services Department Inspection Manual IS-47, Third Edition, Revision 0, dated February 1, 1993, to provide for cause determination in support of determining correction actions "to preclude repetition" of conditions adverse to quality. Neither does the Nonconformance Report form itself (Quality Standard 15.1) require cause and corrective action determinations and close-

out. The audit team considers the lack of determining cause and corrective action determinations for conditions adverse to quality to be a key breakdown in the quality assurance program in meeting regulatory requirements and in protecting the public health and safety, and the environment/ecosystem.

The audit team could not verify that provisions were available at any of the pump stations (Nos. 1, 6, or 10), the Valdez Marine Terminal, or Anchorage facilities visited by the audit team for a discrepant materials crib that complied with the QA program in Section 15.3, step 2.

The audit team discovered at both Valdez Marine Terminal and at Anchorage, that it is a common practice for nonconforming materials to await instructions from engineering as to discrepant materials prior to initiating a nonconformance report. This is in violation of section 15.2, Documentation and Reporting, which states: "Each nonconformance shall be documented on a nonconformance report and reported to the responsible manager."

The audit team could not locate any engineering implementing procedures or standards that controlled the process for

arriving at nonconforming materials dispositions (i.e., rework, reject, use-as-is, repair).

The audit team has determined that the control of nonconforming items both procedurally and as conducted, fails to properly report, control, and eliminate deficient conditions adverse to quality.

XI. B.9 OPERATIONS

QA-36, Section 5.1 General states:

> "Operation of the pipeline system is the core activity of Alyeska."

The audit team discovered at the pump stations visited and the Valdez Marine Terminal that the QA program did not directly interface with all aspects of the operations program. Quality assurance audits of the programmatic aspects of the operations program are basically limited to projects-types of functions dealing with specific items of equipment such as tanks. The QA program has failed to identify that the functional managers generally have not fulfilled their responsibilities to develop, implement, and maintain documented implementing procedures for their areas of responsibility. Additionally, quality assurance has not audited the training programs or their effectiveness at the pump station and Valdez Terminal facilities for all of the operational duties of personnel assigned to perform work. It is visible by the absence of any quality assurance responsibilities regarding operations that the lack of QA interface is planned. The only responsibilities called for in the entire Operations section of the manual are for the Managers of Pipeline, Terminal, Oil Movements and Operations Support, and Human Resources Development.

XI. B.10 PROCUREMENT

Section 9.1 General of the QA Manual states:

> "Control of the procurement process ensures the suppliers capabilities to meet Alyeska requirements are evaluated and that these requirements are accurately conveyed to and met by the suppliers.
>
> "The Manager, Materials Services, is responsible for the procurement process and shall develop, implement, and maintain documented procedures to control the process."

In interviewing the responsible individuals who procure services and materials for Alyeska, the audit team was informed that they had only recently (last of September 1993) received a copy of QA-36, Revision 7.

Therefore, the implementing procurement documents that comply with the criteria contained in QA-36, Revision 7, have yet to be written and approved for use.

Alyeska has failed to adequately transfer regulatory and specifically quality requirements placed on them by the TAPS agreements, to their vendors. For example: The Alyeska contract to Tidewater Pacific Inc. for escort vessels supporting SERVS has not included quality requirements that have an impact on the vessels' abilities to properly support their mission (e.g., storage of hazardous materials, maintenance of equipment that is essential to supporting their escort and/or rescue activities). Neither does the

Alyeska contract to K&W Transportation Company for tank trucks include quality requirements that have an impact on the trucks' abilities to properly support their mission (e.g., transport of hazardous materials).

The audit team determined that, contrary to the requirements of the QA Manual, projects does not have in place a defined process or program to perform work. This was identified both at the pump stations where projects-type work was being conducted and at the Valdez Marine Terminal. Not only were the implementing procedures absent defining the total make-up of a project work package, but the inspection plans, especially for electrical work, lacked specific acceptance criteria.

The lack of an implementing procedure defining the form, format, and content of a project package created a problem that came to the audit team in the form of an allegation. Instrumentation technicians contacted the audit team (requesting confidentiality) alleging that they were directed by their immediate supervisor to "stuff" work packages with project-specific safety plans that were not an original part of the package as issued and would not have been available for the audit team without generating the checklist for that

purpose. These work packages were the specific packages requested for review by the audit team. The results of the investigation by the audit team is reported in more detail elsewhere in this report.

The procurement process and files for vendor materials and services do not adequately interface with the Alyeska quality assurance program. Purchase orders issued for materials and services in all instances reviewed by the audit team did not adequately include quality and regulatory requirements applicable to Alyeska which would also be requirements for the specific suppliers. A feed-back mechanism into the procurement records does not exist for such items as nonconformance reports, work orders reporting failures of equipment, audits, surveillances, and fitness-for-duty results. Procurement has no way of knowing the ongoing status of materials or services, either for immediate action or future reference. There is no mechanism, therefore, for procurement to properly evaluate performance of either equipment or services from an overall performance perspective. This could adversely affect the health and safety of the public and the environment/ecosystem.

Imminent Threat

While these short comings are serious, the primary harm is financial. When coupled with an inadequate receiving function, these conditions warrant a Class 3 Imminent Threat categorization on the basis of potential loss of design safety margin.

XI. B.11 PROJECTS

QA-36, Section 6.1 General states:

> "This section establishes responsibilities for projects involving construction, maintenance, and operational enhancements. Projects may be assigned to Projects, Pipeline, Terminal, or other departments."

The audit team determined that, contrary to the requirements of the QA Manual, projects does not have in place a defined process or program to perform work. This was identified both at the pump stations where projects-type work was being conducted and at the Valdez Marine Terminal. Not only were the implementing procedures absent defining the total make-up of a project work package, but the inspection plans, especially for electrical work, lacked specific acceptance criteria.

The lack of an implementing procedure defining the form, format, and content of a project package created a problem that came to the audit team in the form of an allegation. Instrumentation technicians contacted the audit team (requesting confidentiality) alleging that they were directed by their immediate supervisor to "stuff" work packages with project-specific safety plans that were not an original part of the package as issued and would not have been available for the audit team without generating the checklist for that

purpose. These work packages were the specific packages requested for review by the audit team. The results of the investigation by the audit team is reported in more detail elsewhere in this report.

Imminent Threat

These deficiencies can vary in magnitude depending on the seriousness and complexity of a given project. The more serious and complex the project, the more imminent the threat becomes. That aside, the deficiency is classified as a Class 3 Imminent Threat.

XI. B.12 QUALITY RECORDS

Section 17.1 General of the QA Manual states, in part:

> "Control of quality records is essential in demonstrating that requirements were met and for ensuring availability of records for future reference."

Section 17.2 Records Administration states, in part:

> "1. The functional manager responsible for developing documented procedures, specifications, or procurement documents shall specify quality records to be generated. . . .
>
> "3. Documents shall be considered valid records only if initialed or signed and dated by authorized personnel. Records may be originals or copies."

Section 17.3 Receipt states, in part:

> "The functional managers of organizations receiving records shall develop, implement, and maintain documented procedures which include provisions for:
>
> "1. identifying required records;
>
> "2. ensuring that required records are received;
>
> "3. verifying that records received are acceptable;
>
> "4. protecting records from damage or loss; . . ."

The audit team could not determine the process used to assure that there was a complete listing of:

1. all required construction records by type (e.g., construction traveler, general inspection record, NDE record, test);
2. all required records by equipment I.D. for components, systems, structures; or,

3. accountability that all required construction quality records were received.

17.3, step 3, allows for copies of original quality records to be accepted as an original record. The QAM, however, does not include the requirement for the functional organization to have a procedure for developing a "certified true copy" process.

The QAM also did not provide the requirement for a procedure to assure that quality records were microfilmable (e.g., size of characters, quality of characters, and entries).

The audit team observed that the quality records program, much like the document control program, is fragmented, inefficient from a document retrieval and control standpoint, ineffective, and not an integral part of the Alyeska QA Program.

XI. B.13 QUALITY ASSURANCE

It is the assessment of the audit team that the single most important regulatory requirement to which Alyeska committed during the operation and maintenance of the TAPS is to maintain the safety margin of the TAPS, thereby protecting the health and safety of the public, and the environment/ecosystem. This awareness/maintenance of the safety margin is assured by the implementation of Section 9, "Construction Plans and Quality Assurance," to the Agreement and Grant of Right of Way for Trans-Alaska Pipeline between the United States of America and the Owner Companies, dated January 23, 1974. Compliance with the rest of the provisions of the Agreement is an integral part of achieving these protections.

This Agreement requires Alyeska to design and maintain a "comprehensive" quality assurance program which is "designed to assure that the environmental and technical Stipulations in this Agreement will be fully complied with . . ."

It is also the assessment of the audit team that the owners abrogated their commitment to the government of the United States, and to the health and safety of the public, and the environment/ecosystem, by not assuring that Alyeska developed

and maintained a comprehensive and disciplined QA program with the advent of operation of the TAPS.

The first essential element the audit team attempted to verify was Alyeska's compliance to the policy requirement specified by the quality Program Manual, QA-36, revision 7, dated October 30, 1992, which states, in part: "It is the policy of Alyeska Pipeline Service Company . . . that each supervisor and manager is <u>responsible and accountable</u> to ensure that <u>all work complies</u> with applicable <u>agreements, codes, standards, and government regulations</u>." (Emphases added.)

The finding of the audit team was that the TAPS project has failed to ensure compliance with "agreements, codes, standards, and government regulations." Alyeska failed to present any verifiable mechanism to assure that the project had ever totally identified their regulatory requirements and incorporated those requirements into operating and maintenance implementing procedures. Neither has Alyeska implemented a training and audit program to assure that regulatory requirements essential to activities affecting quality are understood and met by project personnel.

This failure by Alyeska to implement its own policy of regulatory compliance, signed and committed to by the President of APSC, dates back to the original issuance of the Quality Assurance Manual, Revision 0, dated June 7, 1977, which states, in part:

"1.1 Policy

"It is the policy of Alyeska Pipeline Service Company that each manager or superintendent is held accountable for ensuring that all work under his responsibility complies fully with the provisions of the following control documents:

"a. Right-of-Way Lease for the Trans Alaska Pipeline between the State of Alaska and the Owner Companies, dated May 3, 1974.

"b. Agreement and Grant of Right-of-Way for Trans Alaska Pipeline between the United States of America and the Owner Companies, dated January 23, 1974.

"c. Applicable governmental codes and regulations.

"d. Approved plans and specifications.

"If the responsible superintendent or manager fails to comply with the control documents listed preceding, the Manager, Quality Assurance has authority and responsibility to take action to ensure compliance; this includes authority to stop work or to direct work to be performed as necessary.

"The Trans Alaska Pipeline Quality Assurance Manual QA-36 delineates the program by which Alyeska shall fulfill the above requirements. All organizational components whose activities affect the quality of pipeline operations and maintenance are governed by QA-36 to the extent indicated herein. The provisions of QA-36 apply to all work which affects the environment or the pipeline system integrity or operability."

The same required commitment was repeated and also endorsed by the Presidents of the Alyeska Pipeline Service Company for revisions to the QA Manual: Revision 1 dated May 30, 1979; Revision 3 dated May 9, 1985; and, Revision 5 dated March 16, 1987 (Revision 2 dated December 15, 1980, Revision 4 dated December 1, 1982, and Revision 6 dated September 1, 1992, were never issued). Although the current Revision 7 of the QA Manual policy statement reads differently, the requirement for Alyeska to comply with all agreements, codes, standards, and government regulations remains the same.

Furthermore, in addition to the Alyeska President and Chief Executive Officer's approving QA-36, Revision 7, for implementation by the TAPS management, the following Alyeska representatives endorsed QA-36, thereby committing to its total implementation by their respective organizations:

- the Director, Control and Quality Assurance;
- the Vice President, Operations;
- the Vice President, Engineering and Projects;
- the Vice President, Environment and Contingencies;
- the Vice President, Human Resources and Administration;
- the Vice President, Corporate Affairs; and
- the General Counsel, Law.

The fact that the highest levels of Alyeska management have always committed to adherence to their TAPS regulatory responsibilities by promising -- but failing to fulfill that promise -- to implement and follow a dedicated and comprehensive quality assurance program throughout all phases of construction and operation, makes this audit team finding even more egregious.

In addition to identifying a QA program breakdown in that Alyeska has failed to identify and enforce its regulatory commitments through its implementing procedures, the audit team reviewed QA-36, Revision 7, by section with the following general findings:

Authority and Responsibilities

Requirement - "President"

"Accountable for the overall effectiveness of the corporate quality program."

Finding

The past Alyeska presidents did not display a commitment to quality, nor did the owners hold the past presidents accountable for this programmatic breakdown.

This fact was clear to the audit team not only by the expressions of concerned ex-quality assurance individuals to the regulators and Congress ("whistleblowers"), but also of past *and current* employees/contractors of Alyeska to this audit team directly through its interview process. This expression of concern regarding the failure of Alyeska to implement a total and effective quality program was echoed by individuals across all disciplines.

Interviews of long-service TAPS employees/contractors have verified that the owners have not held the past presidents accountable or required the development and implementation of a total approach to quality that the TAPS Agreement demanded.

The past and present "effectiveness" of the "corporate quality program" was, and remains, dysfunctional and incapable of assuring that the TAPS had been constructed and could operate efficiently and safely in a manner such that the health and safety of the public, and the environment/ecosystem could be assured.

Requirement

"Manager, Corporate Quality Assurance"

"Responsible for developing, revising, maintaining, and verifying satisfactory implementation of Quality Program Manual, QA-36. This responsibility and authority includes the resolution of quality program related conflicts and issues including the issuance of stop work orders."

Finding

As this report will identify, the audit team found several weaknesses in the QA-36, Revision 7, as well as in its implementation. None was greater, however, than in the Quality Assurance Manager's lack of organizational responsibility, freedom, and authority to direct and implement an effective quality assurance program in accordance with Section 9 of the TAPS Agreement.

As is discussed further in this section of the report, the audit team identified significant areas of concern regarding implementation of section 2.6 "Stop Work Provisions" and Section 16 "Corrective Action" by the QA Manager and his organization. The QA Manager, as well as the QA individuals interviewed by the audit team, have indicated that any attempts to increase the scope or effectiveness of the QA program through issuance of a more comprehensive QA Program Manual (e.g., QA-36,

Revision A, submitted for approval, date unspecified. In the past, including the recent past, the QA organization has recognized and identified to management the need to issue Stop Work Orders (SWO's) and Corrective Action Requests (CAR's) in order to bring the TAPS into compliance with the TAPS Agreement and the QA Program. These attempts proved to be futile, as verified by the fact that there has never been a CAR or SWO issued on the TAPS project, even though the QA organization has recognized the need. From 1980 to 1990, there was one person performing the QA function, the Senior QA Engineer. In 1987, he reported to the Inspection Supervisor; and in September 1990, there was a reorganization, and there was a Manager of QA reporting to the Director of Control and Quality Assurance. In 1990, the QA department consisted of the Manager of QA and the Senior QA Engineer and a secretary, until a build-up of QA personnel began in 1992 to the present staff of eight, including the Manager and the secretary. For several years, QA reported directly to the Manager of Engineering, Planning and Support, who reported directly to Engineering.

The QA individuals have stated, however, that progress is currently being made in QA's becoming a more effective operation at the TAPS, and they look forward to becoming the responsible activity demanded in the TAPS Agreement.

Requirement

"Employees and Contractors"

"Responsible for complying with Quality Program Manual, QA-36, and implementing procedures. Responsible for communicating quality concerns to their supervisor, or if the quality concerns are not resolved by their supervisor or manager, to the Manager, Corporate Quality Assurance." (Emphases added.)

Finding

The audit team found a general lack of knowledge among the work force of those individuals contacted and/or interviewed by the audit team as to QA-36 or their obligations to it. There was also a general lack of implementing procedures required by the QA Program Manual. A Quality Assurance Program Manual training course and training schedule has just recently been developed for TAPS managers and supervisors; however, it is the understanding of the audit team that this training program does not include employees/contractors below the level of supervisor.

The issue of the QA program dealing with employee quality concerns is an area of significant concern to the audit team. There has been a very visible history of Alyeska's ineffectiveness in resolving employee/contractor quality concerns from the open-door/chain-of-command perspective as defined in this authorities/responsibilities paragraph.

As stated above, the role and responsibility of the QA program as defined in QA-36, Revision 7, is basically not understood by the general work force, other than that QA does audits and surveillances. Therefore, the work force does not look to QA as the mechanism to resolve employee quality concerns, and to the knowledge of the audit team, employees do not, and would not turn to the Manager of Quality Assurance as the means to resolve their quality concerns.

Neither has QA been effective in requiring the prompt identification and resolution of conditions adverse to quality, including failures, malfunctions, deficiencies, deviations, and nonconformances. The fact that an ineffective and dysfunctional QA program has been allowed to exist at the TAPS by Alyeska and its owners,

renders moot the issue of the QA Manager as the final authority in the resolution of employee quality concerns.

The management responsibilities that are laid out in Section 1 are meaningless to the effectiveness of the QA program. As determined by the audit team, the QA program was and remains dysfunctional and has not adequately defined the regulatory requirements to be incorporated in each functional organization's operating and implementing procedures, and has failed to adequately audit and survey these areas of management responsibilities to assure that those regulatory requirements have been met. The end result has been that everybody is responsible for everything, with no one responsible for verifying that everything is in compliance.

Paragraph 2.2

Paragraph 2.2, Program Documents, states:

"The quality program is defined by the following three tiers of documents:

"1. *Quality Program Manual* - the corporate document describing quality program requirements nd responsibilities for their implementation;" [QA-36, Revision 7, Effective Date October 30, 1992]

"2. *Quality Standards Manual* - interdepartmental procedures describing implementation of the Quality Program Manual and defining activities and interfaces for work performed by multiple departments; and" [Quality Standards Manual QS-92, Revision 0, Effective Date TBD (to be determined)]

"3. Departmental Procedures - procedures that provide detailed instructions for work performed within a department." [Quality Services Department Inspection Manual IS-47, Third Edition, Revision 0, February 1, 1993]

The audit team determined through its audit process at the various TAPS facilities that it was unclear until recently the status of Quality Program Manual QA-36, Revision 7, effective October 30, 1992. At the time of the audit, not all second-tier quality standards had been developed and/or approved for use (JPO approval required). Preliminary approval had been granted by the JPO on February 9, 1993 (Letter No. 93-1-R, from Jerry Brossia and Nolan Heath to John Dayton and Sam A. Flint), which stated that:

"It is our understanding that as Quality Standards are developed, Alyeska desires to implement the Standards plus the related sections in QA-36, Revision 7. This is acceptable to the JPO provided that all fifteen Quality Standards are submitted for JPO review and approval by March 31, 1993 as depicted in the Quality Standards Schedule submitted by letter 92-4827 dated December 15, 1992. Once the Quality Standards have been approved by the JPO, we will then be in position to review, for final approval, Alyeska's entire QA Program in accordance with the right-of-way documents. As a result of that review we may

> require development of additional Quality Standards or submittal of certain departmental procedures."

With this understanding by the JPO and Alyeska, the audit team requested a quality program matrix or similar method that defined to the various Alyeska functional managers the status of the QA program which particular sections of the QA Manual QA-36, Revision 7, were applicable for use, and which particular sections out of QA-36, Revision 5, were to be relied upon to direct the QA Program. No such instrument, either in a matrix or other format, had been prepared or was available for the audit team's review.

A review of the Index of Quality Standards Manual, QS-92 revealed that there were no comparable Quality Standards for the following sections in QA-36, Revision 7:

QS 5.1 Operations

QS 10.1 Handling, Storage, Packaging, Shipping

QS 12.1 (identified as Special Processes in QA-36) is only entitled "Welding" in QS-92. No other special processes are identified.

QS 13 (identified as Inspection and Testing in QA-36) covers only Inspection.

QS 16.1 Corrective Action

QS 18.1 Quality Audits and Surveillance

The definition of a Quality Standard, as identified in both QA-36 and QS-92 is:

> "An interdepartmental procedure describing implementation of the Quality Program Manual and defining activities and interfaces for work performed by multiple departments."

The audit team, in reviewing the above Index of Quality Standards, determined that the total complement of standards provided for use in critical areas/programs was inadequate. The standards reviewed by the audit team also lack acceptance criteria for performing essential work which is important to safety, such as general inspection (mechanical, electrical, civil/structural).

The Quality Standard (13.1) lacks any guidance for the qualification and certification of general inspectors across all disciplines (mechanical, electrical, civil/structural). Neither is there any criteria for performing tests (which include at a minimum experiments, special engineering tests, post-maintenance tests, post-modification tests, operational testing).

Additionally, there is no quality standard for determining cause (including root cause) or corrective actions which are required in order for a functional organization to resolve CAR's, SWO's, or audit findings, and preclude recurrence.

The audit team determined through its interviews and review of Quality Services Department Inspection Manual IS-47 (Third Edition, Revision 0, February 1, 1993) that the basic use and benefit in the field of IS-47 is the use of the various forms and how to fill them out. The procedures included in IS-47 were generally found to be shallow in defining specific requirements, with the exception of Quality Standard 15.1, Control of Nonconforming Items, which appears to be adequate for its immediate use. However, the audit team takes strong exception to the fact that the nonconformance report does not require cause or corrective action consideration to preclude recurrence of deficient conditions adverse to quality.

The audit team found Section 6, Qualification/ Certification of Inspection Personnel, inadequate in defining the requirements for general inspection

personnel. The audit team is also extremely concerned about the use of "adjunct inspectors" to determine the acceptability of hardware conditions which are essential to the health and safety of the public, the environment and the ecosystem.

It is the assessment of the audit team that adjunct inspectors were authorized for use by the Quality Services organization to meet specific schedule demands of the project. The use of adjunct inspectors therefore, in the assessment of the audit team, emphasizes cost and schedule over quality and safety. Alyeska management, in responding to the audit team's concerns regarding the use of adjunct inspectors, references Quality Standard 13.1, paragraphs (d) and (f) as the authority for the adjunct inspector program, which state:

> "(d) ensures qualifications and/or certifications of engineers assigned to perform Quality Services' inspection activities are reviewed and accepted;"
>
> "(f) ensures Quality Services' inspectors, including engineers or technicians assigned as inspectors, either employed by or contracted to Alyeska, are qualified and certified, when required, in accordance with department procedures;"

The audit team interviewed adjunct inspectors who were concerned that they were directed to perform acceptance inspections (electrical and concrete) for which they were neither qualified by previous experience or training in either the discipline or as inspectors, and were not provided specific inspection criteria with which to perform the inspections. Neither quality standard 13.1 nor Inspection Manual IS-47, Section 6, incorporates the criteria for qualifying and certifying inspection personnel which would justify the use of instrumentation technicians as inspectors. This totally defeats the philosophy of independence from cost and schedule and from inspecting their own work.

In response to the audit team's concerns regarding adjunct inspectors, Quality Services Department submitted the following justification:

> "Alyeska's Inspection Manual IS-47 section 6 requires the review of Inspector qualification and certification, work experience, special training, and references as they apply to the inspectors field of expertise and the defined scope of work.
>
> "Personnel utilized as inspectors where inspection is not their primary responsibility are referred to as Adjunct Inspectors. These Adjunct inspectors are not any different from other inspectors utilized by Alyeska in regards to their qualifications and the indoctrination they receive to the Alyeska inspection policies and procedures. The adjunct inspectors are qualified Technicians

and Engineers that are utilized on a limited basis to efficiently perform inspection. The majority of the adjunct inspection work is of an instrumentation nature which corresponds to the expertise of these inspectors.

"The resumes of the potential adjunct inspectors are reviewed by the Quality Services Department prior to any inspection assignments. These inspectors then receive at least 8 hours of training covering proper inspection and documentation procedures. A total of 5 resumes were submitted for consideration as adjunct inspectors and of these 4 were accepted and completed the training program. The 4 adjunct inspectors are Electronic/Instrumentation Technicians.

"The inspection work is not considered the primary responsibility for these adjunct inspectors. They have other technician duties and as such are only utilized in special situations that match their expertise where a regular qualified inspector is not readily available. So far it has been estimated that Adjunct Inspectors have been utilized for only about 10 hours of inspection work.

"None of Alyeska's inspectors inspect their own work."

In response to the submittal by Quality Services Department, the audit team submits the following:

1. Alyeska's Inspection Manual IS-47 section 6 does not provide specific criteria that is used as the basis for accepting Inspector qualification and certification, work experience, special training, and references as they apply to the inspector's field of expertise and the defined scope of work.

2. There is a significant concern regarding the statement that "Adjunct inspectors are not any different from other inspectors utilized by Alyeska in regards to their qualifications and the indoctrination they receive to the Alyeska inspection policies and procedures." The adjunct inspectors interviewed by the audit team had no previous inspection experience, and the inspection policies and procedures did little to compensate for this lack of previous inspection experience, facts which they recognized themselves, and did not prepare them for the inspection tasks which they were assigned. Being qualified technicians and engineers, no matter how limited the basis may be, and no matter how "efficiently" the inspection may be performed from a time and cost standpoint, does not assure that they can *effectively* perform inspections. The adjunct inspectors may not inspect their own work (although the audit team received allegations to the contrary which have not yet been thoroughly investigated), they do perform inspections on the specific project to which they are assigned.

The audit team has additional concern because of the wording of Section 13.3, Qualification and Certification of Personnel, of QA-36, Revision 7, which states, in part:

> "13.3.1 Quality Control Inspectors
>
> "Quality Control Inspectors shall be qualified and certified, *when required*, in accordance with documented procedures under the Alyeska quality program or under the contractor's quality program approved by Alyeska." (Emphasis added.)

The statement itself raises questions regarding the extent of experience, training, and qualifications required for quality control inspectors. When coupled with statements made to the audit team regarding the lack (in some instances, the total lack) of previous inspection experience by some adjunct inspectors and the assertion that adjunct inspectors "are not any different from other inspectors utilized by Alyeska in regards to their qualifications and the indoctrination they receive to the Alyeska inspection policies and procedures," the concern is increased.

Paragraph 2.3

Paragraph 2.3 of QA-36, Revision 7, states, in part:

"1. Functional Managers are responsible for complying with agreements, codes, standards, regulations, this manual, and other applicable documents. The regulatory requirements include but are not limited to:

"a. *Agreement and Grant of Right-of-Way for the Trans-Alaska Pipeline between the United States of America and the Owner Companies*, dated January 23, 1974;

"b. *Right-of-Way Lease for the Trans-Alaska Pipeline between the State of Alaska and the Owner Companies*, dated May 3, 1974;

"c. *49 CFR 195, Transportation of Hazardous Liquids by Pipeline;*

"d. *49 CFR 192, Transportation of Natural and Other Gas by Pipeline: Minimum Federal Safety Standards*; and

"e. other applicable safety and environmental regulations.

". . . Table 2-1 is a summary compilation of the stipulations in the Agreement and designates the functional managers responsible for adherence to each stipulation listed. This table is not intended to be an exhaustive listing of all the regulations that apply to permittees and Alyeska.

"Functional managers shall ensure that the applicable requirements of the documents mentioned above are incorporated in the departmental procedures and that these procedures are implemented.

"2. The Manager, Corporate Quality Assurance, shall conduct audits and surveillance to verify compliance with requirements of the above documents, as applicable."

As previously identified in this report, Alyeska has failed to identify the regulatory requirements committed to in the various documents specified in sub-items a. through e. above. Further, Alyeska has failed to assure that all these various types of requirements have been integrated into the TAPS operating and maintenance implementing procedures.

The QA organization has failed to audit the various functional organizations for compliance to Section 2.3, which is essential in determining the basic framework for assurance that the TAPS will not present a threat to the health and safety of the public, and the environment/ecosystem.

The issue of the functional managers not defining applicable regulatory requirements and where those requirements are addressed in their implementing procedures and instructions leaves the status of the TAPS indeterminate and, as discussed elsewhere herein, constitutes an imminent threat in the assessment of the audit team.

Paragraph 2.4, Application of Management Controls

The audit team has generally determined that Alyeska management does not control work performed on the TAPS by dedicated implementing procedures and instructions that define the work process and acceptance criteria to be administered. This lack of specific procedural control was identified at both the organizational level (e.g., how a work group is to function) and at the piece part level (e.g., how a particular work order/preventive maintenance is to be conducted/accepted).

This audit team finding is contrary to step 2., which states:

> "2. Management controls are described in procedures, instructions, or specifications defining specific responsibilities for work performance and verification."

2.5 Audits and Surveillance

This section was not complete in time for inclusion.

2.6 Stop Work Provisions

Although stop work order (SWO) provisions have been in effect with the release of the first edition of QA

Manual QA-36, no SWO's have been initiated to date. The

audit team's review of Alyeska's processes and programs, both current and past, have identified areas which certainly would warrant stop work orders to be issued; e.g., all electrical as-built drawings do not adequately reflect the actual configuration of the installation; however, electrical projects continue to be issued for work. This lack of configuration control has placed the health and safety of the electrician/electrical technician/inspector at immediate risk, as well as increasing the risks to the health and safety of the public.

This lack of implementing positive control is contrary to Section 2.6, which states, in part:

> "The Manager, Corporate Quality Assurance, has the authority to issue Stop Work Orders when continuing work activities would significantly increase hazards to personnel, the public, the environment, or the pipeline system."

2.7 Control of Quality Program Manual

The status and control of the Quality Program Manual QA-36, which is mandated by the U. S. Government to control activities essential to the health and safety of the public, the environment, and the ecosystem, has not met the requirement of

this Section, which states, in part:

> "The Quality Program Manual shall be issued to Supervisors, managers, and other appropriate individuals as a controlled document.
>
> "The Quality Program Manual shall be reviewed annually by the Manager, Corporate Quality Assurance, and shall be revised when necessary to:
>
> "1. comply with changes in regulations, codes, and standards;
>
> "2. reflect significant changes in the corporate organization; and
>
> "3. include enhancements based upon changes in technology and industry practices."

As previously identified in this report, QA-36 revisions 2, 4, and 6 were not issued, but were incorporated into subsequent revisions at a later date (i.e., Revisions 3, 5, and 7). The audit team did not review the non-issued Revisions and their impact on quality. However, the implementation of the QA program in effect during the time period of Revisions 2 and 4 was completely ineffective from even a general oversight perspective, much less from a project control aspect.

This ineffective quality program as defined in the

various Quality Program Manuals has had a degrading effect on the quality and integrity of the TAPS. This is evidenced by the current status of the TAPS regarding such issues as:

- equipment installations that do not meet structural or seismic requirements;
- as-built drawings that do not reflect the configuration of the TAPS;
- massive National Electric Code violations;
- the lack of a quality monitoring program for piping girth welds; and,
- sections of the pipeline that are in hard contact with their vertical support members.

Imminent Threat

The deficiencies cited warrant a Class 1 Imminent Threat categorization. In combination they are capable and will likely cause death or severe injury, loss of containment, and loss of design safety margin.

XI. B.14 RECEIVING INSPECTION

Receiving Inspection is a verification process that specified materials, parts, components and partially fabricated assemblies received, conform to the applicable requirements. The inspection is generally performed by a certified quality control inspector or other personnel who are qualified, (typically certified) by experience and knowledge.

Receiving Inspection requires coordination with the procurement program and typically depends on the facilities provided through the storage and warehousing program. Together, procurement, receiving, and storage are responsible for acquiring, verifying, and safely holding purchased goods until used in the field.

Locations

The receiving inspection function was reviewed by the BLM/QTC audit team at the following locations:

Valdez Marine Terminal, and the

Anchorage Warehouse.

In addition inspections at other locations with receiving experienced, provided input.

Audit Results

The receiving inspection function was not documented in programmatic form until November, 1992, when the Interim Material Control Program was issued. In May, 1990 initial Alyeska internal material certification requirements were issued via a memorandum. Prior to the issuance of the Interim Material Control Program, the status of the receiving function, and hence materials, parts, components, and assemblies was indeterminate. Under the current program, several inadequacies remain.

A. Special Requirements

Under the Interim Material Control Program (IMCP), section 2.0, Responsibilities, paragraph 2.3, Receiving Inspectors, Warehouse, receiving inspectors are responsible for among other things:

checking the purchase order for item description and special or supplementary requirements beyond the requirements of the IMCP (These additional requirements are to be detailed on the purchase order.); and completing the receiving inspection per the IMCP and any supplementary requirements identified in the purchase order.

IS-47, Third Edition, Section 8, Receiving Inspection,

paragraph 8.2.2 b), instructs the receiving inspector to document the inspection results on the RIR (Receiving Inspection Report). Attribute number 12 on the RIR is "Special Tests/Inspections." This attribute description, given in Exhibit 4, page 3 of 3 of Section 8, instructs the receiving inspector to perform special tests or inspections that may be required to verify items meet specified requirements.

These procedural requirements are inadequate. In the case of "special requirements" which are to be detailed on the purchase order, the receiving inspector is to perform a "special test." Once the special test is done, the inspector then indicates by writing the letter "A" (for acceptable) or "R" (for rejectable) in a box on the receiving inspection report. If the inspector was qualified to perform the special test (not a given), and if the special test was designed and performed properly (not a given), the inspector still has no place on the inspection report to document the special attributes or otherwise describe the test.

In view of the scoping statement in the Interim Material Control Program, it is likely that a good number of items received would require special or supplementary requirements.

The IMCP specifies that it only provides guidance with respect to: structural plate, shapes and bar; pipe and piping components; valves; fasteners; and tubing and tubing components.

B. Receiving Inspection Report (RIR) usage

The RIR specifies 13 inspection attributes. In reviewing the inspection function, it was determined that there is not a uniform understanding as to what these attributes mean or what the threshold is to reject versus accept an item. As examples:

In reviewing RIRs several were noted to have the Shipping Damage attribute box marked as "/" (signifies Not Applicable). On questioning, an inspector indicated that to his recollection there was no shipping damage and that was why he used N/A. He indicated that he didn't want to cause any confusion by using the letter "A" (specifies acceptance), since he did not want anyone to think that he had accepted shipping damage.

In another instance a box of gauges had been accepted. Some had covers on the male threads, some did not. The inspector had accepted this order for attribute 5, Protective Covers/Seals. He explained that since the purchase order had not specified that the covers be

present, he had accepted that attribute.

One order consisted of several small bore stainless valves with filters. The filters were packaged separately and had no identifying markings or tag. The filters had been accepted. When questioned as to how the inspector knew the filters were the right ones for the valves, he indicated he didn't. He added that the field user would know, and if they were incorrect they would be sent back.

These irregularities along with others suggest that the RIR attributes are inadequately specified. It also indicates that the information recorded on existing RIRs is suspect.

C. Controlled Procedures and Drawings

Receiving inspectors observed did not have ready access to nor did they use controlled procedures or drawings to perform their duties. One inspector had a training copy of IS-47, another had an uncontrolled copy of the Interim Material Control Procedure.

Comments from inspectors indicated that drawings are seldom,

if ever, used or provided as a basis for inspection. The RIR dimension attribute calls for inspectors to verify "significant dimensions, such as base plate mounting holes, overall external dimensions, configuration and orientation of nozzles, structural steel copes, etc., conform with the procurement documents." When asked how these verifications were performed without the aid of drawings (which in this case are the inspection requirements), responses varied but clustered about the theme that the dimension attribute was essentially ignored. The rational presented was that if the configuration was wrong, the field user would reject it and send it back to the supplier.

D. Certification Documentation

Certification documentation includes certificates of conformance/ compliance, certified material test reports, mill test reports, and other supplier-forwarded documentation attesting to the quality of the materials delivered. This is the first attribute in the receiving inspection report. All of the current documentation reviewed had the purchase order specified certification documents.

E. Tools and Facilities

Receiving inspection facilities require adequate space and tools/equipment to perform the required inspections.

Precision measuring tools and equipment were not found at the receiving facilities. There was no segregated or controlled area for inspection, there was no segregated/controlled area for nonconforming items, and there was no temperature or humidity controlled area for receiving or holding sensitive equipment. Tools and facilities for receiving inspection are inadequate.

F. Nonconforming Items.

Both the Interim Material Control Procedure (paragraphs 3.9 and 4.3) and IS-47 (paragraphs 8.2.2 i), j), and note) allow or require inspectors to use inspection reports in lieu of nonconformance reports. This is direct violation of the parent document, QA-36, Section 15.2 which requires that each nonconformance shall be documented on a nonconformance report and that inspection reports shall not be used in lieu of nonconformance reports.

Receiving Inspection Deficiencies

- Receiving inspection procedures are inadequate to assure that items received meet the procurement requirements.
- Receiving inspection tools and equipment are inadequate.
- The receiving inspection reports are indeterminate.

Imminent Threat

The audit results and noted deficiencies represent a Class 3 Imminent Threat since collectively they are capable of causing indeterminacy of design safety margin for parts or components of systems important to containment.

XI. B.15 SPECIAL PROCESSES

Section 12.1 General of the QA Manual states:

> "Controls of special processes are required when results are highly dependent on the process or the skill of operators, or both, and when the quality of the item cannot be readily determined by inspection or test. Special processes include both work and inspection processes, such as welding and nondestructive examinations."

The audit team found Alyeska's special process program to be narrow in scope, and one that does not include applications that meet the requirements of the special process program defined by Alyeska.

During inspection of electrical cabinets at the Valdez Marine Terminal, the audit team identified wiring and connection deficiencies that violated national electric code standards. Wires were improperly terminated in crimp-type terminal lugs (e.g., all strands not inserted in the crimped lug).

In addition to wiring and connection methods not being included in the category of a special process, Alyeska has failed to assure that electrical connections are properly performed and inspected. The major areas of concern by the audit team in this regard are:

- the lack of an adequate operator and inspector training program to assure that wires are properly prepared for

crimping and soldering;

- the use of crimpers that are not calibrated; and
- the lack of adequate inspection criteria when wiring and connection methods are involved in work activities (e.g., work orders/PM's/Projects).

Leak Testing is not included in the listing provided in step 12.2.2, Nondestructive Examination Procedures, which states, in part:

> "The Manager, Quality Services, is responsible for developing and qualifying nondestructived examination procedures, including:
>
> "1. liquid penetrant;
>
> "2. magnetic particle;
>
> "3. ultrasonic;
>
> "4. electromagnetic testing; and
>
> "5. radiography.
>
> "Nondestructive examination procedures shall be reviewed by a Level III Examiner certified by examination in accordance with the American Society for Nondestructive Testing, Recommended Practice SNT-TC-1A."

SNT-TC-1A includes Leak Testing as part of those NDE activities that require special process controls. Although Alyeska committed to ASNT-TC-1A, the requirements of this document are not include in the quality system of controls.

Imminent Threat

These deficiencies, particularly in the electrical area, qualify as a Class 2 Imminent Threat. They are capable and likely to cause loss of design safety margin to a level below approved design.

XI. B.16 HANDLING, STORAGE, PACKAGING, AND SHIPPING

Section 10.1 General of the QA Manual states:

> "Controls for the handling, storage, packaging, and shipping of items prevent damage, loss, or deterioration and ensure availability of items for use.
>
> "The Manager, Materials Services, and functional managers shall develop, implement, and maintain documented procedures as described in 10.3."

Location.

Stock Rooms/Warehouse were visited by the BLM/QTC audit team at the following locations to verify adequacy:

Pump Station 6;

Pump Station 10;

Valdez Marine Terminal;

Anchorage - Arctic Slope Inspection Services (ASIS); and,

Anchorage - Main Alyeska Warehouse.

Audit Results

The audit team identified the following strength pertaining to stocking of material:

Stock material, spare parts, and spares located at the pump station mini-warehouses are bar-coded as a part of the receiving process. During this process, the material handler applies a bar-coded label directly to the part/material or, in the case of very small parts, to the box or container in which they are packaged. This process allows real-time analysis of usage levels

which plays a large role in establishing and adjusting ordering/stocking criteria to assure that appropriate spare parts for critical systems are on hand when needed.

The audit team identified several areas of concern which render as indeterminate the integrity of selected equipment and material stored by Alyeska at the various locations inspected:

A. Implementing Procedures.

Quality Program Manual QA-36, Revision 7, Section 10, paragraph 10.3, Procedures, states:

"1. The Manager, Materials Services, shall develop, implement, and maintain documented procedures to comply with handling, storage, packaging, and delivery requirements and convey these requirements to suppliers via procurement documents. These procedures shall include provisions for the following, as applicable:

"a. handling and storage by Alyeska or contractors after receipt;

"b. shipment to and from remote storage and point of use; and

"c. handling hazardous materials within Alyeska facilities.

"2. Functional managers such as the Manager, Pipeline; the Manager, Terminal; and the Manager, Ship Escort and Response Vessel System; shall develop and implement procedures for handling, storage, and shipping items at warehouse under their areas of

responsibility.

"Handling, storage, packaging, and shipping procedures shall ensure that:

"a. items in storage are inspected periodically to detect evidence of deterioration or expiration of shelf life.

"b. receipt and dispatch of items from storage areas are controlled; and

"c. item packaging, marking, and labeling are durable, legible, and sufficient to preclude inadvertent combination of incompatible items in storage or delivery."

Quality Standard No. 11.1, Revision 1, Effective Date 1-8-93, states:

"1.0 PURPOSE AND APPLICABILITY

"This Standard describes the interdepartmental procedure for receipt, handling, acceptance, identification, **and storage of items** in accordance with Sections 9, **10**, and 11 of the **Quality Program Manual**." (Emphases added.)

"This Standard applies to all Alyeska organizations involved in the control of items which affect safety, pipeline system integrity, or the environment."

Contrary to the requirements of QA-36 and QS 11.1, the following was identified:

1. Neither the Manager, Material Services, nor the functional managers, including the Quality Services Manager, have developed or implemented procedures, including acceptance criteria, for the handling, storage, or shipping of prime safety

equipment/components/material that assures the physical integrity of said items.

B. Goods Stored Lack Protection

It is the assessment of the audit team that the primary objective of Alyeska in maintaining storage facilities/stock rooms is to supply a dedicated space for easy access to the user, not to assure proper facilities and protection from deterioration/damage of stored items. The following identified conditions support the audit team's assessment:

a. hazardous commodities (those requiring Material Safety Data Sheets (MSD's) are stored in uncontrolled quantities and not segregated from the rest of stocked items, at all locations inspected. It should be noted that the Manager, Valdez Fire/Safety/IH (Terminal) has committed to providing a dedicated, segregated, and enclosed facility for the storage of all hazardous commodities at the Valdez Terminal.

b. Ports and threaded connections for devices such as pressure transmitters are open to the contamination of the surrounding area

without any form of capping or thread protection.

c. Sensitive devices are stacked on top of each other, including those with glass faces, with no protection from metal shelving surfaces or each other.

d. Stock rooms lack proper storage space; hence, controlled stock items are stacked in aisleways, on top of cabinets, and in the case of Pump Station No. 6, stored outside the stock room under the stairway leading from the stock room.

e. The total complement of flexitalic gaskets for joining and sealing piping flanges (all sizes) were improperly stored in the stock room at Pump Station No. 10. These very sensitive (to damage) gaskets are hung on nails and arranged by sizes. This inappropriate storage method leads to the gaskets being deformed (becoming out of round), distortion of the innermost ring, and the potential for damaging/weakening the delicate spot welds which secure the sealing internal rings.

f. The stock room at Pump Station No. 6 was open for general entry. The mesh

security grating which was erected to prevent unauthorized entry was incomplete. General entry was possible mid-way up the stairway leading to the locked stock room door.

g. There is no evidence that the stock rooms are periodically inspected to detect evidence of deterioration of equipment or expiration of shelf life.

h. There have been no audits of the stock rooms by the quality assurance organization from 1990 to date (which is the period of audits reviewed by the audit team).

i. Passed inspection tags are not in evidence on the items stored at the facilities inspected by the audit team. A discrepant material crib or cabinet has not been provided which would assure segregation of discrepant items and prevent their inadvertent use.

j. The audit team observed warehouse personnel placing printed circuit boards into black static-resistant bags without using wrist grounding stats. When questioned why grounding stats weren't being used, the response was that no protective devices were

provided and that, indeed, they did not know that their insertion into the bags could damage the printed circuit boards that were being shipped to the field.

C. Deficient Conditions at ASIS

The following conditions were discovered by the audit team during an inspection of the precision measuring and test equipment (PM&TE) storage facility and the warehouse for the Arctic Slope Inspection Services (ASIS):

(a) The humidity and temperature controlled PM&TE storage room, which is a controlled access area, was open to general entry and the room was no longer under proper environmental control.

(b) Discrepant and out-of-calibration PM&TE was unidentified and comingled with equipment that had been calibrated.

(c) PM&TE was improperly stored, stacked, and not protected from damage.

(d) Approved PM&TE shipping boxes used for housing equipment in support of nondestructive examinations were stacked in the general office area hallway. When questioned by the

audit team, the QA/QC Vice-President of Technical Services responded that the cages were empty and that they were there awaiting receipt of their PM&TE from the vendor in Connecticut that was contracted to calibrate said devices. The Vice-President stated that the PM&TE were shipped to the vendor in Connecticut in cardboard boxes utilizing "popcorn" (a styrofoam packing material) in lieu of their authorized shipping and handling containers because of the fear that the vendor would steal the cases and they would not be available for use in Alaska.

(e) The ASIS shipping department was not provided with alternate approved engineering shipping instructions in lieu of using approved engineering-designed shipping and handling containers. Since the vendor returned calibrated equipment in the same unauthorized shipping containers that they received the equipment in, the integrity of the calibrated device and its ability to properly perform its safety-related function is indeterminate.

(f) The warehouse shipping doors were open and warehouse personnel were changing an engine of their privately owned vehicle inside the confines of the warehouse.

Shelving next to the vehicle contained several boxes and loose containers of hazardous chemicals in spray cans under pressure used for performing liquid penetrant inspections. Also in the same shelving were other boxes identified as containing corrosives, as well as other general test equipment and boxes of spare parts. This act of unauthorized work being conducted on a gas-powered engine with gas vapors present at open connections from the gas tank and from the carburetor, coupled with the fact that doors were open to an alleyway, presented a hazardous condition which otherwise would not have been encountered. Allowing activities of this nature to exist in a warehouse that contains thousands of pounds of records stored in boxes, corrosives, and explosive cans subject to fire and heat, in the

assessment of the audit team, presented a Class 2 imminent threat to the health and safety of the public in the immediate area of this warehouse and other buildings located in the area.

(g) There was no separate storage facility and enclosed cabinets provided for hazardous and flammable materials. These hazardous materials were comingled with other equipment in storage such as various precision measuring and test equipment devices. These devices were also improperly stacked or positioned such that they could fall or be damaged.

(h) Alyeska contract equipment was comingled with other equipment utilized for other contract clients. Fire protection in the warehouse appeared to be generally ineffective due to the locations of the sprinklers with respect to the height of the storage cabinets and the way materials are stacked in those storage racks. This, coupled with the imminent threat discussed in item (f) above, exacerbates the potential threat by the inability of the fire protection system to be able to properly respond to fires.

The Alyeska QA program is not integrated into the Handling, Storage, Packaging, and Shipping program maintained throughout the TAPS facilities (i.e., Anchorage, Fairbanks, Pump Stations, Valdez Marine Terminal).

It is the assessment of the audit team that the issues identified, involving the general topic of material control included in this section, are the direct result of a dysfunctional QA program which is unable to fulfill its function.

Imminent Threat

Deficiencies in this section warrant classification as a Class 2 Imminent Threat based on the capability to cause severe injury, and indeterminacy of design safety margin for select parts or components of containment systems.

XI. D.1 LESSONS LEARNED

Alyeska has established through an Operational Directive, "Pipeline SAF-21," a program entitled "Lessons Learned Program," dated 9/16/92. This program requires, in part, that "[V]aluable information stemming from accidents, incidents and near miss situations is shared in a timely manner, . . . " The directive also required that "[A] 'Lessons Learned Worksheet' . . . must be completed for . . . accidents, injuries, spills of hazardous materials, incidents such as fires or other damage . . . "

Once a "Pipeline Department Lessons Learned Worksheet" is completed, the form is distributed to:

"Manager, Pipeline

"Pipeline Maintenance Manager

"All District Managers

"All Pump Station Supervisors

"All Pipeline Fire/Safety Specialists

"All Fire Protection Specialist [sic]

"Manager, Corporate Fire & Safety

"Manager, Terminal

"Valdez Fire Safety III Manager

"Manager, Projects

"Projects Safety Coordinator"

Items 5 and 6 of the directive state:

"5. Each Pump Station Supervisor will review the information on the worksheet with his/her shift at the next safety meeting. Document each lessons learned review on the Group Meeting Record (Form 1254) for the meeting.

"6. When both shifts have had an opportunity to review the lessons learned, the worksheet copy should be filed in 10.08.01 'Lessons Learned Sheets' for future reference. The original worksheet is retained and filed after it has been reviewed in a safety meeting at the originating station."

The audit team has reviewed both the scope of the program and its implementation at the TAPS. The audit team has determined that both the scope and implementation of the directive is narrow and does not assure adequate, lasting, and verified corrective action that protects the health and safety of the public, and the environment/ecosystem.

The Alyeska lessons learned program is deficient in the following areas.

The lessons learned program is deficient in that:

1. All potential areas supporting the TAPS where personnel errors or procedural problems affect performance (e.g., operating, maintenance, calibration, inspection, human factors) are not included in the scope of the Lessons Learned Program.
2. No provision exists that requires the supervisor to use a root cause analysis program when determining cause and corrective actions (blocks 2 and 3 of the Lessons Learned Worksheet) to prevent recurrence.
3. No provision exists that requires lessons learned to be recapped into the user's documented program (e.g., drawings, instructions, procedures).
4. No provision exists that requires lessons learned to be incorporated into the formal training program.
5. No provision exists that requires lessons learned to be audited by QA to assure lasting implementation and effectiveness.

The lessons learned program implemented by Alyeska is, as described by the Alyeska program, to be part of their overall approach in applying root cause and failure analysis

techniques to resolve and prevent recurrence of accidents/ incidents.

The audit team has determined that by Alyeska's not implementing an adequate root cause analysis program, of which the lessons learned process is an essential element, creates a Class 2 Imminent Threat to the health and safety of the public, and the environment/ecosystem.

XI. E. TRAINING

Section 19.1 General of the QA Manual states:

> "The training program provides a systematic approach to ensuring that personnel and contractors are adequately trained to perform their work safely and efficiently, the training is current, and the training performed is documented.
>
> "The Manager, Human Resources Development, is responsible for the training program and shall develop, implement, and maintain documented procedures for the program.
>
> "Functional managers are responsible for identifying required training, contacting the Manager, Human Resources Development, for assistance, and ensuring that training is achieved for their personnel and contractors."

Location:

Pump Station Nos. 1, 6, and 10

Valdez Marine Terminal

Anchorage

Implementation of the training program by Alyeska is in general noncompliance with the Alyeska QA Manual (QA-36, Revision 7). The training department's program to implement the mandatory training program which encompasses regulatory requirements is shallow and lacks the depth to properly assure that all mandatory (regulatory) requirements are understood and implemented by Alyeska personnel. For example, the quality assurance program is a regulatory

requirement specified in the TAPS agreement; however, this program is not considered to be a mandatory training requirement.

Contrary to the QA Manual, the Department of Human Resources, which is tasked with the responsibility of ownership of the training program, views itself as a service organization to assist in training when called upon by other functional organizations. The resulting training of these organizations is disjointed, incomplete, and fails to meet the needs required in order for all persons involved in safety functions to adequately understand and perform as required. A feedback mechanism to the training department resulting from deficient conditions discovered in the field via NCR's, trouble tickets, work orders, etc., does not exist. The staffing of the training department is insufficient to develop and support adequate training modules and to support an adequate training program. Additionally, a program for cause determination of those deficient conditions adverse to quality does not exist. Therefore, the training department has no way to evaluate the effectiveness of the training program or increase training as required.

An effective training element at Alyeska is doubly mandatory since many of the organizations have failed to develop implementing procedures required to direct their efforts and responsibilities.

The training of the functional managers themselves is in question because they have not defined applicable regulatory requirements and where those requirements are addressed in their implementing procedures and instructions; this lack of definition and procedural compliance leaves the status of the TAPS indeterminate and constitutes an imminent threat in the assessment of the audit team. This lack of an adequate training program presents a Class 3 imminent threat to the health and safety of the public, and the environment/ecosystem.

The audit team attended a training session at Pump Station No. 10. A safety representative was directing the class and the training subject was Work Permits.

There were sixteen items under discussion that were intended to get input from pump station personnel in order to resolve the "Question" and/or "Problem" encountered TAPS-wide regarding work permits.

Following are fifteen of the items regarding work permits presented and discussed at the safety training session:

"2. Problem: Confusion on who signs in and out on permit.

"3. Question: What time do we enter on the permit?

"4. Question: Do we need permit for Fire Watch?

"5. Question: When is a Hot Work Permit required?

"6. Problem: Pre-Permit not working. Control is in hand of the CRO [Control Room Operator] and he does not always know what is required.

"7. Problem: Permit incomplete, not enough detail from Projects, etc., when trying to complete permit.

"8. Problem: Problem completing permits during turnover. Too much confusion and permit does not get the attention it requires.

"9. Cold Permit - No signature on it.

"10. Question: Permit cancel or job cancelled verses [sic] permit closed. Need standardization. It is not clear what the permit is requiring. . . .

"12. Question: Who is ultimately responsible for the job - Question is about the 'Responsible Person' signing the permit? - Define 'Responsible Person'.

"13. Problem: CRO has to take the word of the worker that they are prepared for the job as they indicate they are.

"14. Problem: There are a lot of automatic 'Yes' entered because the CRO doesn't know and is unable to find out.

"15. Problem: The responsibility and accountability needs to be applied to 'someone'!

"16. Problem: There is always a rush to complete permit in a timely manner."

The audit team asked the safety instructor what was the root cause of why these questions and problems were being encountered at this late date in the operation of the TAPS. His response was basically that these were areas that personnel didn't understand and he was visiting each pump station to resolve the areas by conducting this typical training session.

In response to the question presented by the audit team, an attender of the session responded by stating that the problems and outstanding questions were created because there was no procedure available to guide operations in these issues.

The audit team reviewed the Trans-Alaska Pipeline Corporate Safety Manual SA-38, Second Edition, Revision 4, dated April 12, 1993, Section 1.1, Entitled Safety Code No. 1 - Work Permit System, and determined that the attender was correct.

SA-38, as written, does not constitute an implementing procedure and does not preclude the types of issues resulting in the confusion identified above. This lack of a sound training basis reinforces the audit team's findings that the training of individuals is not based on detailed and comprehensive implementing procedures that include work instructions and criteria. Until the TAPS project is in compliance with the QA program that requires functional managers to develop and utilize instructions, confusion such as that at Pump Station No. 10, as indicated above, will continue to surface at all levels of work activities.

XIII. LABOR PRACTICES/CONDITIONS

A. Some Alyeska technicians do not have certificate of fitness (Electrical)

It is the audit team's finding that this allegation has been substantiated by both technicians and inspection personnel. It is unclear to the audit team that the state required fitness program for Alyeska personnel serving in the maintenance, projects, and inspection areas are properly experienced in the specific responsibilities required of them to support the TAPS. This is exacerbated by the lack of specific proceduralized instructions and criteria.

XIII. B. LABOR PRACTICES/CONDITIONS

Alleged drug and alcohol abuse [Fitness for Duty]

The audit team met with the Director of Occupational Health and the Senior Occupational Analyst. The Alyeska requirement to initiate a drug testing program occurred in 1989. The formal program was implemented in 1990, with the start of drug testing in 1991 to their established program.

It has been, however, against the Alyeska policy since 1980 to allow the use of drugs or alcohol on the project.

The program for drug and alcohol abuse, including aberrant behavior, was reviewed by the audit team and found acceptable. The incidents of failed alcohol and drug tests for potential employees and random results of those employed on the project was also reviewed.

One weakness in the program is that the test results (overall) of those contract personnel tested is not fed into the procurement records for tracking of the vendor's compliance to Alyeska's policy of an alcohol/drug-free project.

XIII.C. **Allegation: "Stuffing" of Documents and Harassment**

The audit team investigated the allegation that technicians were directed by their immediate supervisor to initiate project-specific safety plans in an attempt to misrepresent project work packages requested by the audit team. Additionally, it was alleged that project quality inspection plans were initiated after-the-fact and placed ("stuffed") in the project work packages which also misrepresented the content and completeness of the work packages requested for review by the audit team. It was further alleged that this "stuffing" of documents was followed by continuing harassment of the technician by his direct supervisor once it became known that the technician had made contact with the audit team. The events associated with these allegations occurred as a result of the audit team's requesting access to project files as part of its BLM audit and investigations.

Audit Team Findings

The events which led to the allegations began on September 5, 1993, when the audit team was at Pump Station No. 6 reviewing the overall process on how projects were performed in the field. The Operations Supervisor explained that project work packages are assembled in Anchorage and that teams are brought out from Anchorage with the materials to complete the

work. The operations supervisor explained that the content of a project work package included such items as a specific safety plan for the work scope to be accomplished. The safety plan was in addition to the pump station safety briefing that each individual had to attend upon entering the pump station. The operations supervisor further explained that all individuals working on the specific project work package had to be briefed on the project safety plan and sign a training roster form to verify that the individuals were aware of the safety requirements pertaining to that package.

The supervisor also stated that specific quality inspection plans were initiated for each project work package and that individuals were made aware of the inspection requirement prior to the start of work.

Other documents were also mentioned as being included in each project work package (e.g., FAR's for that job, work procedures). The audit team leader contacted his BLM interface at Anchorage and requested, among other documents, a list of Projects, including those currently in work, project policies, procedures, and instructions, including contractors' policies, procedures, and instructions. The BLM representative forwarded the request to Alyeska for action.

It was explained that the audit team would review the list upon return to Anchorage and select a few project work packages for review to verify how the project work was performed in the field vs. the instructions in the various work procedures. A basic tenet of the audit team's approach was to look at Alyeska's work control and planning approach in assuring the safety and quality of the projects being implemented in the field. Many of these projects involve critical operations which could not only impact the health and safety of the public, but which also require extraordinary measures to assure that personnel safety and quality are maintained. The audit team recognized that many of the jobs performed as part of the projects require skill, proficiency, self-checking, and great attention to detail on the part of the individuals performing the work in the field.

These were all part of the reasons for the audit team's request for those specific project records. An integral part of the audit team's assessment was verification that the controls defined in the field as being part of normal work activities were indeed integrated into those work packages, and that the necessary information was quickly and readily retrievable.

Following the audit team's return to Anchorage from its audit of the pump stations and the Valdez Marine Terminal, contact was made to the audit team by an individual expressing concern that the audit team could have been misled in its conclusions by certain events of which that individual had knowledge. On September 21, 1993, an individual contacted the audit team regarding an incident involving the "stuffing" of project files with back-dated documents. The individual identified to the audit team the name of the person involved in the incident, stated that that individual requested that the audit team contact him at home, and provided his home phone number with the request that the audit team contact the person that evening.

It was essential for the audit team to investigate these serious allegations to determine their validity, and if verified, to ultimately ascertain the potential for meeting the criteria for an imminent threat. Therefore, and as requested, the audit team leader contacted the individual at the home telephone number which had been supplied, on the evening of September 21, 1993. The audit team leader identified himself to the individual and explained that the audit team had been contacted earlier that day with the

request that the individual be telephoned that evening at home regarding the back-dating of documents being stuffed into project files. The audit team leader explained the charter of the audit team and stated that the audit team was under a contract with the BLM and had been given complete independence for granting confidentiality to witnesses wishing such anonymity. The individual requested confidentiality. The audit team leader stated that he could meet with the individual at his home, or they could meet at the audit team leader's apartment, or at some other neutral location. The individual stated that he would stop into the audit team's office to review and sign the confidentiality agreement.

The individual explained that he was a technician. He and other technicians had been directed on Wednesday, September 8, 1993, to assemble project work files which were requested for review by the BLM audit team. The individual stated that he had been scheduled for another assignment, but that his assignment was cancelled due to the BLM audit team's request for documents and the need to assemble such documents.

The individual provided some details of his work history and stated that he had worked for Alyeska for many years, most

recently as a contractor in the position of a technician. He stated that, as part of the assembling of documents responsive to the audit team's request, he had been told by his supervisor to develop project-specific safety plans and incorporate those plans into the work packages on which the technician had worked. The technician refused to take part in the activity.

Without getting into specific details regarding the audit team's investigation or its investigative techniques, the following information regarding the issues under discussion was provided to the audit team by knowledgeable individuals, some of whom were under a confidentiality agreement with QTC in accordance with its commitments to BLM.

As it was described to the audit team: One individual explained to the audit team leader that when he went into work on September 8, the place was in a panic. He said that individual folders for each of the projects were laid out on a long table. As he described it, several technicians from his crew were "stuffing" documents into the folders. One of the technicians was operating the word processor, making up safety plans. Other documents required to be in the folders

were also missing. One group of documents which he specifically recalled was the Quality Inspection Plans, which were also being made up and "stuffed" into the folders. He stated that this practice went on through Friday, September 10, 1993.

The technician stated that his supervisor told him that "this will fool the BLM." This statement was also independently relayed to the audit team during the subsequent interview process.

On September 22, 1993, the audit team leader alerted the BLM in Washington, D. C., and at the Joint Pipeline Office (JPO) in Anchorage that a confidential witness had contacted the audit team with an allegation of technicians initiating and "stuffing" safety plans and quality inspection plans into project packages requested for review by the audit team. The audit team leader then stated that the audit team was gathering additional information and would start interviewing additional witnesses within the next couple of days.

The technician was in contact with the audit team's office on September 22, 1993, and expressed concern that his discussions with the audit team might have violated a

specific directive of the company to the technicians to report any contact with the BLM audit team and specifically to notify their respective supervisors of any such contact.

The technician felt that he needed to follow the rules which had been set down by his management regarding contact by the audit team, so he informed his supervisor of the audit team's call to him at home. He was informed by his supervisor that his manager and the legal department wanted a written statement from him regarding everything that was discussed during the conversation, including all of the questions asked by the audit team and his responses.

The technician stated that he informed his supervisor that his discussion with the audit team was confidential and that he would not put such information in writing or verbally discuss the conversation between him and the BLM audit team. He stated that his supervisor got upset with his refusal to provide the requested document, and repeatedly insisted that he must provide such a document.

The technician stated to the audit team that although he understood that he himself had breached the confidentiality

aspect, he did not want to divulge the details of the conversation held with the audit team. He gave the audit team permission to investigate further and to pursue the details of the matter with Alyeska. The audit team's purpose for including any reference to this incident in this report is limited to the investigative conclusions drawn by the audit team insofar as those conclusions relate to the specific issues of this report.

The audit team leader stated that his (the technician's) position regarding having signed a confidentiality agreement with the authorized audit team of the BLM needed to be made very clear to his supervisor, even to the point of documenting the fact that there was a confidentiality agreement and that he wanted to keep the conversation with the BLM audit team confidential.

The technician originated a letter expressing his desire to maintain confidentiality, and he informed members of the audit team that his supervisor was irate upon receipt of the letter and threw it back to him, refusing to accept it. The technician stated to the audit team that personal harassment accelerated after receipt of the letter and he needed some assistance to get it stopped.

The audit team members explained that in order to do that, the audit team would have to use his name and that the team needed to get this matter resolved quickly. The technician agreed. He also agreed that the audit team could use his name and that it was acceptable to divulge the fact that his concern relayed to the audit team was the stuffing of documents. He suggested that it wouldn't really matter, because the moment the team looked into the files and asked questions, those in the group would know that he was the one who had alerted the audit team to the addition of documents in the file, especially since it was already general knowledge that he had been in contact with the audit team.

On the 24th of September, the audit team met with the technician's group manager. The audit team asked several questions about his organization, its function, etc., and about the audit team's request to review project files. The manager responded that it required a significant amount of work to gather the files and that several boxes of files had been sent to the audit team as requested.

The matter of the audit team's contacting the technician at home was then raised by the audit team. The manager

expressed concern that the individual had been contacted after hours at home and that the audit team's call made the technician uncomfortable. The Manager also stated that the technician reported the contact to protect himself from inappropriate contact, and that the technician did not feel comfortable writing up the discussion he had with the audit team, that he was concerned that if he did, he would compromise a friend of his.

The audit team asked the Manager if he had an idea as to the concern that the technician had raised to the audit team. He said he had a good idea, and explained his impression of the matter. The audit team leader responded that the concern expressed to the audit team was not that relayed by the Manager, but rather involved "stuffing" and backdating of documents into the files that had been gathered by his organization in support of the audit team's request to Alyeska.

The audit team leader requested the Manager's support in arranging for interviews, starting with the supervisor, and he was provided with the additional names of the individuals requested to be interviewed. The audit team leader requested that this investigation by the audit team not become general

knowledge which might interfere with an in-process investigation by the audit team. The manager stated that upon initial receipt of the request of the audit team, he had initiated a self-assessment with a teamed member from Quality Services to determine any weaknesses in the process. He suggested that the audit team contact the quality control representative as to the findings of the self-assessment.

The interview process was initiated with the technician's immediate supervisor, who was allegedly the individual directing the stuffing of the documents. During the interview, the audit team asked about the work load that was placed on his organization regarding the accumulation of the files requested by the audit team. He stated that it was difficult and time-consuming because the records were at many different locations, and some had to be pulled out of the computer.

The audit team asked if all of the documents, even though they might be at many different locations, were available. His answer was that yes, they were.

The audit team requested to see the files which had been prepared in response to the team's request. The team was directed to a cabinet containing several file folders. The supervisor displayed the contents of several of the files, going through the files and showing the audit team the various documents which were included. None of the files displayed by the supervisor contained any information or an index that would indicate that the documents accumulated were not originally available in the form and format or signature status as represented in the files. Additionally, the supervisor did not indicate, nor was it visible in any of the files, that an audit or self-assessment was conducted by quality control and that documents were prepared and placed into the files after-the-fact.

All of the information which the audit team had requested (e.g., safety plans, issued and approved (and signed off) quality inspection plans, FAR's) was in the files. One would have thought that the signatures on the quality inspection plans observed by the audit team had been signed on the same date which was typed in the "Date Issued" block; however, the audit team had been alerted by individuals that quality inspection plans had been accumulated and signed off after-the-fact and during the "stuffing" activity prior to

the arrival of the audit team. This fact was substantiated by the audit team during its further investigation and interview process with Alyeska personnel involved in the activity. Although each individual did not specifically write in a date by his/her signature, in the assessment of the audit team, the logical assumption and the obvious intent was to make it appear that the signatures on the documents were obtained on the issue dates which were typed in.

Conclusions

The allegation was substantiated which was relayed to the audit team to the effect that the development and "stuffing" of project-specific safety plans had occurred after-the-fact.

The allegation was substantiated which was relayed to the audit team to the effect that "stuffing" and signing had occurred of quality inspection plans with an earlier issue date identified than the actual date on which they had been signed and approved, which was several weeks after the date that was typed in.

The allegation of continuing harassment regarding contact of the above-referenced individual with the BLM audit team was

substantiated. Further, it is the understanding of the audit team that harassment continued even after the BLM audit team discussed the matter with the technician's manager, as well as the Vice-President and the President of Alyeska. This was confirmed to the audit team leader by sources including the technician himself.

It was further concluded by the audit team that:

1. Implementing procedures for the most part have not been developed, and do not exist, to control work activities; this prevents adequate planning and compliance to those plans.
2. Inadequate procedures fostered the event described above, and will continue to encourage intimidation and harassment.
3. Alyeska management has demonstrated a lack of ability to properly evaluate its mid-level management.
4. Alyeska management has demonstrated an inability to adequately perform, and report on, investigations of allegations.
5. Alyeska management has demonstrated an inability to prevent and/or control intimidation and harassment of employees by middle-level management.

XIII.C.1. LABOR PRACTICES/CONDITIONS: LEADERSHIP OF PERSONNEL

The audit team has recognized a major Alyeska strength regarding a "grass roots" ad-hoc team approach to positive creative problem-solving. The audit team, in performing their audit at Pump Station Nos. 1, 6, and 10 had the opportunity to closely work with the personnel at those locations. This close interface was relatively short in duration, but was intense, and provided a better opportunity for open communication and understanding.

Reportedly, the methods utilized by the audit provided insight and reenforced understanding of the station personnel as to process and program responsibilities and their effect on the integrity and reliability of hardware.

As a result of the BLM/QTC audit, the on-site leadership of the three (3) pump stations encompassing the three (3) districts, including Pump Station Nos. 1 through 12, have formed an ad-hoc team whereby the audit team's scope, methodology, and general findings are being integrated to:

- compile audit notes;
- identify areas that can be quickly resolved;
- categorize issues (e.g., whether systemic, site-specific);
- develop comprehensive work orders, project work

packages, etc.;

- identify symptoms and perform root cause analysis;
- schedule activities; and
- make recommendations on issues that may be controversial due to cost, organizational impact, etc.

The audit team is very encouraged by the activities of this select but integrated activity and considers it a strength.

Alyeska Personnel Interviewed by QTC
September/October 1993 TAPS Audit

Abel, Rick	V.P. Environment Health & Safety
Albro, Jerry	Senior Mechanical Engineer
Allen, Tom	Project Cost & Scheduling Manager
Allen, Bob	PS Supervisor A Shift
Andersen, Ed	Pump Station 1 Supervisor
Anderson, Robert	Manager Quality Control & Compliance (Termina
Anderson, Mark	Civil Engineering Coordinator
Baer, Rona	Senior Secretary I
Baldridge, John D.	Oil Spill Manager SERVS
Batley, Bob	Technician PS 1
Biddy, Chuck	Senior Quality Control Coordinator
Bishop, Bruce	Assistant Project Manager
Blackhut, Larry	Supervisor Quality Control
Bogart, Jim	OMOS Operations Support Supervisor
Bonillas, Jane	Technical Training Administrative Assistant
Boudy, Neal	Manager Technical Training & Development
Bowen, Laveta	Pump Station Administrative Assistant
Brady, Tom	Senior Occupational Health Analyst
Brashears, Pat	Field Engineering Supervisor
Brasic, Bill	Maintenance & Engineering Technician
Brooks, Scotty	P/S 10 Operations Supervisor A Shift
Brown, Rex	Operations Supervisor C Shift (Terminal)
Broyan, Judith	
Bruner, Jerry	
Buell, Ken	Process Control OSF Construction (Pool)
Carey, Tom	
Carlton, Robert	Fire Protection Specialist A-Shift
Carr, Kathy	Manager Employee & Labor Relations
Carson, Dean	Senior Mechanical Engineer
Carter, Richard	Senior QC Program Coordinator
Centofanti, Dale	
Chapman, Roy	Technician, DPLN
Clark, Cammy	Vermon Co. Construction Supervisor
Coffman, Larry	Technician Valdez
Collins, Rick	Manager Terminal
Connly, Tom	P/S 10 Technician
Connolly, Tim	Contract Compliance Senior Analyst
Cooke, Greg	Manager Southern District PS 9 - 12
Coulliette, Carol K.	PS 10 Administrative Assistant A Shift
Criner, James	P/L Civil Maintenance Supervisor
Cross, Bill	Technician PPLN
Crualdo, Don	
Cusick, Mike	Project Quality Control Engineer
Cutting, Larry	Safety /IH Field Specialist, SERVS
Dahlstrom, Robin	Technician, Terminal
Daniels, John	Captain
Dayton, John	S.V.P. Operations & Engineering
Deerfield, Bill	
Devereux, Dan	Engineer Coordinator

Alyeska Personnel Interviewed by QTC
September/October 1993 TAPS Audit

(continued)

Dewar, Steve	Technician, PPLN
Dickason,Gene	Manager Environmental
Doherty, Phil	Maintenance & Engineering Technician
Dossinger, Jim	V.P. Administration
Drew, Jerry	Construction Supervisor
Dunham, Gay	Electrical Engineering Coordinator
Dupree, George	Manager SCADA Operations Support
Elliott, Bob	Senior Mechanical Engineer
Elliott, Richard	Process/Control Manager (Terminal)
Eppley, Hal	ADC Warehouse Supervisor
Erwyn, Gwen	Manager Support Services Senior Assistant
Evans, Randy	Technician PPLN, PS 1
Everard, Jerry	Operations and Engineering Special Projects
Fant, George	
Farjami, Fred	Tanker/Vapor Control Senior Manager
Farmer, Mike	Pump Station 1 Material Handler
Faville, Nancy	Senior Lab Technician, OMOS
Finney, Susie	Senior Operations Support Analyst
Flint, Rodger	Staff Buyer
Freie, John	Quality Assurance Supervisor
Frichtl, Bill	Senior Electrical Engineering Coordinator
Ganry, Rich	
Gatlin, Kay	Administrative Planning Aid
Gawrys, Rich	Technician, PPLN, PS 1
Georgell, Gary	Fire/Safety Specialist PS 1
Gjerde, Helen	Senior Administrative Assistant
Globig, John	P&CM Supervisor
Gould, Gary	Operations Supervisor
Grantham, Mary	Chugach North Technical, Valdez
Green, John	Grune Consultant
Greenlee, Dave	Manager Equipment
Gurney, Cal	Technician PS 1
Hamilton, Ron	Senior Field Representative (Valdez)
Hankee, John	Manager Contracts
Hansen, Duwaine	SCADA Technician
Hanson, Roy	Oil Spill Rep Supv C-Shift
Harle, Jim	Senior Engineering Coordinator (Terminal)
Harvey, Tim	Manager Logistics
Haskill, Bob	Manager Purchasing Buyer
Howes, Percey	
Heffman, Keith	Manager Process Safety Management
Hessee, Mel	Compliance Program Coordinator
Hilbeln, Wayne	Safety/IH Specification Terminal
Hines, Mike	QA Audit Coordinator
Hisey, Dan	Manager Central District P/S 5-8
Holland, Dave	District Project Supervisor Fairbanks

Alyeska Personnel Interviewed by QTC
September/October 1993 TAPS Audit

(continued)

Hoskinson, Dennis	Senior Telecommunications Specialist
Howitt, Bill	V.P. Human Resources
Hudson, Bill	Senior Quality Assurance Auditor
Isaacs, Marnie	Manager Media Relations
Iversen, Roger	Manager Corporate Security
Jessee, Mel	Compliance Program Coordinator
Johnson, Mary	Administrative Assistant Secretary
Jones, Steve	Manager Operations (Terminal)
Jones, Lee	Manager Northern District P/S 1-4
Jordan, Steve	Technician
Karbacher, Peter	Training Systems Coordinator
Karnowski, Tim	Senior Quality Control Engineer
Kelley, Mike	Process & Control OSF Construction (Pool)
Kilty, Karen L.	Government Staff Liaison Specialist
Kirk, Bob	OMOS C.E.I. Supervisor
Klechka, Ernie	Process and Mechanical Engineering Superviso
Klepper, John	Manager Marine Operations
Kloster, Don	Senior Quality Control Coordinator
Kopp, Mike	Manager Measurement & Scheduling
Kornberg, Mindy R.	Attorney
Koszarek, Philip	Marine Supervisor D Shift
Koszarek, Phil	Marine Supervisor D Shift (Terminal)
Ladd, Larry	P&CM Supervisor
LaForte, Greg	Operations Supervisor A Shift (Terminal)
Lair, Murray	SCADA Technician, OMOS
Lansing, Robert D.	Quality Control Engineer
LaVine, Norman	Response Supervisor Heritage
Lawlor, Jim	Environmental Representative Pump Station
Lawrence, Dave	Marine Supervisor C Shift
Lchoen, Lee	
Lee, Chuck	Sothern District Engineer B-Shift
Likoen, Les	
Lott, Paul	
Luker, Pat	Process and Control OSF Construction (Pool)
Magyar, Gerry J.	Manager Purchasing
Malveaux, Jerry	SCADA Software Supervisor
Martin, John	Duty Officer
Martin, Terry	Waste Management PM Coordinator
Mautino, Victoria	Pump Station Administrative Assistant B Shif
McCann, Steve	Fire Protection Specialists
McDevitt, Pat	Supervisor Quality Engineering
McHale, Jim	Manager SERVS
Merchant, Judy	Materials Coordinator
Miller, Rick	Quality Control Coordinator (Special Assignm
Miller, Amy	Senior Transportation Specialist
Milton, Tim	
Mishiri, Sean	Manager Purchasing

Alyeska Personnel Interviewed by QTC
September/October 1993 TAPS Audit

(continued)

Mitchell, Nick	Manager Oil Spill & Contingency Planning
Moench, Lee	Manager Projects
Montgomery, John V.	State Records Manager
Monthei, Lee	Construction Manager (Terminal)
Morresey, Leo	Occupational Health Director
Mosley, Bob	Support Supervisor I
Moustafa, Jeff	Maintenance/Planning Supervisor
Munson, Kate	State Librarian
Nealon, Karen	Administrative Support Analyst (Terminal)
Newcomer, Steve	Manager Quality Services
Norman, Leo	
Norton Dave	Civil Engineering Supervisor (Terminal)
O'Donnell, Chuck	Manager Operations Enginering
Odom, Janette	Technician
Oftedal, Bill	
Ogar, Rich	Field Environmental Specialist -North
Olson, Mary	
Osborne, Terry	SCADA Valdez Hardware Supervisor
Pake, John	Control OSF Construction (Pool)
Palmer, Ron	Maintenance Planning Specialist
Pauloski, Debbie	Pump Station Maintenance Supervisor
Peirce, Keth	Process and Control OSF Construction (Pool)
Peterson, Wanda	Administrative Secretary
Plummer,. Tim	Manager Marine (Terminal
Pomeroy, Glen	Northern District Engineer
Prendeville, Dennis	Land and Permits Supervisor
Presley, Tim	Technician PS 10
Preus-Hakari, Martha	Pipeline Training & Documentation Supervisor
Pritchard, David	President & CEO
Provost, Mike	Technician, PPLN, PS 10
Pugh, Rod	Manager Operations Support (Terminal)
Rees, Dave	Manager Technical Training & Administration
Reiswig, Roland	Manager Valdez Fire/Safety/IH (Terminal)
Richardson, Paul	Manager State Government Relations
Rick, Jimmie	Norcom Inc.
Rickey, Sharon	Inventory Control Associate Analysts
Rickey, Allen	District Civil & Projects Supervisor
Robinson, Kenny	Manager Oil Movements & Operations Support
Roddrick, Jim	Sothern District Engineer A-Shift
Roehner, Rich	Process Engineering Coordinator
Ruff, Gary	Technician, Terminal
Runnels, John	Instrument, Electrical & Communications Engir
Santora, John	
Sattlerlee, Steve	Administrative Buyer
Schattuck, Doug	Manager Operation Control Center
Schoen, Lee	P/L Maintenance Supervisor PPLN
Schoff, Bob	Principal Engineer/Lead Mechanical Engineer

Alyeska Personnel Interviewed by QTC
September/October 1993 TAPS Audit

(continued)

Schroeder, Ed	Engineering Services Supervisor (Terminal)
Schwicht, Steve	Manager Maintenance & Engineering (Terminal)
Sentz, Dan	Technician PS 1
Shoaf, Rob	Manager Federal Government Coordination
Smulski,Mike	Senior Quality Assurance Auditors
Sorensen, Steve	P&CM Supervisor
Sphor, Tucker	Technician, Terminal
Staker, Lamont	Terminal, O & M Supervisor
Stanfield, Tom	Training Technician (SME's) B Shift
Steel, Bill	Corrosion Engineering Supervisor (Terminal)
Steinberg, Richard	
Stevens, Mark	Terminal O & M Supervisor
Stinson, Ted	Planning Coordinator
Street, Lloyd	Technician, Terminal
Strickland, Roy	Maintenance & Engineering Technician
Sullivan, Lonnie	Occupational Health Supervisor
Sumner, Rich	Marine Technician
Sunday, Dave	Staff contracts Engineer
Swank, Greg	
Swanson, Vickey	Safety/IH Specialist
Swinbuarn, Clay	Document Control Supervisor
Swink, Marvin	V.P. General Manager
Tansy, Roy	Construction Supervisor
Taylor, Dwayne	Manager Corporate Fire Safety & IH
Teague, John	Zapata, Gulf
Theil, Mike	Maintenance & Engineering Technician
Thicketon, Maggie	Technical Documentation Coordinator
Tonkins, Wes	Senior Engineer Coordinator
Trunipseed, Tom	Subject Matter Expert
Vaughn, Gerry	Senior Administrative Aide (Terminal)
Walker, Bill	Senior Engineer
Walters, Donnis	Technician PS 10
Warner, Jesse	Duty Base Administrator
Wasson, Stew	Technician PS 1
Webb, Douglas	Senior VP Corporate Affairs
Weitel, Gary	
Wellington, Mike	Pump Station 5 - 8 Fire Protection Specialist
Whitaker, Jim	Arctic Slope Consultant, Terminal
Whitaker, Lou Ann	Documentation Assistant
Willard, Oftendal	Terminal O & M Supervisor
Wilson, Joe	Electrical Instrumentation Engineer (Terminal
Wilson, Wayne	Manager Southern District P/S 9-12
Wladkowski, Hank	Manager Quality and Compliance
Wolk, R. G.	Corporate Quality Assurance
Yawitt, Fred	
Ynugi, Frank	Electrical Inspector

Documents Received From Alyeska
BLM/QTC TAPS Audit September/October 1993

Control Room Logs (11/10/92 to 8/7/93)

Material Mgmt System, Material ID by Description (09/7/93)

Work Logs (form 0144) dated 5/12/93

Work Logs (form 0144) dated 6/10/93

Work Logs (form 0144) dated 6/24/93

Work Logs (form 0144) dated 8/4/93

Work Logs (form 0144) dated 8/18/93

POWOR Work Order Numbers - 31000772

POWOR Work Order Numbers - 31000507

POWOR Work Order Numbers - 31001027

POWOR Work Order Numbers - 31000906

POWOR Work Order Numbers - 31001090

POWOR Work Order Numbers - 31001169

POWOR Work Order Numbers - 31001238

POWOR Work Order Numbers - 31000809

POWOR Work Order Numbers - 31000002

POWOR Work Order Numbers - 31000222

POWOR Work Order Numbers - 31001042

POWOR Work Order Numbers - 31001045

PM Numbers 31-FP-2PK-EQPT, 161180/M01, Sched 08/01/93

PM Numbers 31-FP-1PK-FEX, 161182/Y01, Sched 12/01/92

PM Numbers 31-FP-2PK-RACK HOSES, 161184/Y01, Sched 07/01/92

PM Numbers 31-FP-2PK-RACK HOSES, 161184, Y03, Sched 07./901/92

PM Numbers 31-FkP-1PK-MPS, 163180/Y01, Sched 09/01/92

EC-71, emergency contingency Plan)pages 14-20 thru 25 - Fire

Documents Received From Alyeska
BLM/QTC TAPS Audit September/October 1993

(continued)

Protection figures)
Blank Pump Station Control Room Operator Proficiency (dated 05/15/92)

Completed Pump Station Control Room Operator Proficiency (for Sammy Williams)

Lisburne Metering Proof Report (dated 09/05/93)

PS01 (4th Dimension) work Order #1005538

Sag River Contingency Response Plan

Work Order Summary Report (all active work orders, report dated 09/07/93)

Roster of Attendees at Audit Exit Briefing

PM Numbers 31-Gs-1C, 167031/Y01, Sched 07/15/93

PM Numbers 31-EE-EMERG LTG SYS C, 163132/M01, Sched 060993

PM Numbers 31-EE-73, 363133/M06, Sched 07/09/93

PM Numbers 31-G-1C, 163135/M03, Sched 01/15/93

PM Numbers 31-G-1C, 167030/Y01, Sched 0715/92

1992 Chemical Inventory

PS01 Organization Chart (3 pages)

IS-47 committee Interpretations (profs notes from front of IS-47 manual)

Profs note requesting CP-35-1 OSCP and EC-71 Emergency Contingency Plan

Profs note requesting P4876 Engineering Design Package

Datalogger Readings for Power Generation (for seven days)

4 (each) reproduced Prints (from aperture cards)

Process Safety Management contractor Awareness Program Manual (PS-109), First Edition dated March 29, 1993

Documents Received From Alyeska
BLM/QTC TAPS Audit September/October 1993

(continued)

Profs regarding Drug Testing program dated 9/14/93

Right-of-Way Lease, State of Alaska

Cloud Discrepancy Report Log, dated 9/3/93

Pipeline Operations (OCC)

Vision Graphs on Pipeline Status Sheet

Maintenance and Repair Manual, MR-48, Rev 5, dated July 15, 1993

Aerial Topographic - Ortho Photo Plan, for PS 1, 6, 10 and Valdez Terminal Site.

Dwg. Nos. D-31-L601, Rev 4, Sheet 1

Dwg. Nos. D-31-L601, Rev 1, Sheet 2

Dwg. Nos. D-36-L601, Rev 3, Sheet 1

Dwg. Nos. D-36-L601, Rev 1, Sheet 2

Dwg. Nos. D-40-L601, Rev 3, Sheet 1

Dwg. Nos. D-36-L601, Rev 3, Sheet 2

Dwg. Nos. D-36-L601, Rev 1, Sheet 3

Dwg. Nos. D-36-L601, Rev 1, Sheet 4

Dwg. Nos. D-36-L601, Rev 1, Sheet 5

Dwg. Nos. D-36-L601, Rev 3, Sheet 1-10

As-Built Drawing Computer Listing for PS 1, 6, 10 and Terminal

Design specifications:

Summary Sheet describing enclosures

Engineering Dept. Specification Listing

Specification revision & consolidation Project Listing dated 9/3/93

(continued)

Book Manager Read at Alyeska, dated 2/1/93Pipeline

Technical Specifications C-475, C-420, C-510

Trouble Ticket Excepts, 10/92 - 3/93, Pipeline

ValdezTerminalandBragrwMaintenance

Operations Work Order Reporting System, Self Paced Instruction Guide Ver 1.0

POWOR - Pipeline Operations Work Order Reporting System, Quick Reference Guide, Ver 1.0

Standard Inspection Procedure for Pressure Test Witnessing Revision Draft C

Pending SIP{-M-006 Standard Inspection Procedure for NDE Surveillance Draft A Standard Inspection Procedure for Welding

Inspection Revision Draft E

Standard Inspection Procedure for Liquid Penetrant of Welds and/or Other Material Draft

Standard Inspection Procedure-Annual Inspection and Examination of fork Tines, Rev 0

Standard Inspection Procedure for Unregistered Pressure Vessels Rev. 0

Standard Inspection Procedure for Registered ASME Boilers and Pressure Vessels Rev 0

Standard Inspection Procedure for NDE of Main Line, Pump Station Terminal Piping Rev 1

Standard Inspection Procedure for Cargo Tanks revision 0

SIP-H-002 Standard Inspection Procedure for Overhead Cranes Draft A

SIP-C-002 standard Inspection Procedure for Visual Inspection of Anodized Radiators Draft A

F-001 Standard Inspection Procedure for Therminol Heater Stack

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Examinations Revision 0

SIP-C-001 Standard Inspection Procedure for Ultrasonic Inspection of the Ammonia

Liquid Level In Heat Pipes and Heat Tubes

M-002 Standard Inspection Procedure for Magnetic Particle Examination of ferromacnetic materials Draft B

M-0032 Standard Inspection Procedure for Ultrasonic Testing and Examination (Corrosion) draft B

QA Audit ASIS

Nonconformance Reports Issued to Date

23 Tier Quality Program for Quality Services Department

Exhibit B Arctic Slope Inspection Services Contract

QSD Procedures Status Report

NDE Surveillance's

Bidder Pre Qualification

Inspection Manual

Inspection Manual - Second Edition

Inspection Manual - Third Edition

H-001 Standard Inspection Procedure for Mobile Cranes Draft B

SIP-H-003 Standard Inspection Procedure for Overhead Hoists Draft A

H-004 Standard Inspection procedure for Slings and Below-The-Hook Lifting Devices Draft D

Standard Inspection Procedure for Electrical Inspections Draft C

T-001 Standard Inspection Procedure for Bulk Storage Tanks Revision 0

T-002 Standard Inspection Procedure for Bulk Storage Tank

Documents Received From Alyeska
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(continued)

Pressure/Vacuum Valves

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D. Pritchard Presentation, "The Alyeska Plan, Alyeska's Goals, dated 8/26/93

Civil QC Inspection Plan

Memo from R. G. Wolk to Distribution D, dated September 1, 1993 Re: Quality Program Status

Memo from John Freie to R. Shoaf, dated September 8, 1993 Re: Status of quality Standards

ASME Program Plan

Quality Assurance Audit reports

Report No.	Date	Report No.	Date
91-PT-01	4/8/91	92-A06	5/15/92
91-PT-03	5/28/91	92-A08	7/20/92
91-A04	6/10/91	92-A09	8/31/92
91-A05	7/26/91	92-A10	8/26/92
91-A06	8/13/91	92-A11	10/28/92
91-A07	9/8/91	92-A12	10/1/92
91-A08	11/27/91	92-A13	11/13/92
92-A01	3/13/92	92-A14	12/31/92
92-A02	5/19/92	92-A15	12/11/92
92-A03	1/27/92	93-A01	5/20/93
92-A04	A4/10/92	93-A02	4/21/93
92-A05	4/10/92	93-A04	8/13/93
		93-A05	6/22/93

Alyeska letter to Joint Pipeline Office, dated June 30, 1993, Letter No. 93-5167 Re:

Audit & Surveillance Schedules 2nd and 3rd Qtrs. 1993

Quality Assurance Audit Listing for 1991-93 (3 pages & undated)

Owner Audit Subcommittee Audit Reports

Operations Support, dated 8/23/93

Materials & General Services, dated 8/20/93

Documents Received From Alyeska
BLM/QTC TAPS Audit September/October 1993

(continued)

Cash Management, dated 7/28/93 (2)

Project Management, dated 9/22/92

Alyeska Maintenance, dated 8/5/92

Oil Movements, dated 7/17/92

Alyeska Insurance, undated

Alyeska Security and Aviation, dated 7/9/92

Alyeska's Data Center Operations, dated 7/8/92

Alyeska's Property/Tax, dated 6/30/92

Environment and Contingencies, dated 6/3/92

Material Services, dated 12/30/91

Owner Audit Subcommittee Audit Reports (Cont.)

Alyeska Payroll Function, dated 12/30/91

Alyesska Information System, dated 10/28/91

Valdez terminal Operations, dated 8/13/91

Cash Management, dated 4/12/91

Project Management, dated 2/5/91

Root Cause and Failure Analysis (5.M. on 8/26/93 request)

Responses to 5) a through o from 8/26/93 request

Tans-Alaska Pipeline System, Environmental and Operations, Oversight agencies and Regulations.

Materials Services, Department Operating Procedures

Tran-Alaska Pipeline Surveillance procedures and Monitoring Methods Manual, dated May 1977 (11 volumes)

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JPO letters Re: QA-36, Ref. 7

JPO Letter No.	Date
92-0213-T	3/20/92
92-10-R	4/22/92
P001.4181	10/22/92
93-1-R	2/9/93
93-36-R	8/13/93
93-43-R	8/31/93

Status Report, Owners Quality Program Task Force Recommendations, dated March 10, 1993

Letter from S. Pankhurst to W. Rusnack, dated October 9, 1992 Re: Transmitting Owners Quality Progress Task Force Final Report Owners' Engineering Decision Task Force Report, dated August 7, 1993

Preventative Maintenance System Reports

Four (4) Boxes responding to first and fourth bullets of the September 7, 1993 request

1992 Line-Wide Slope stability Review, dated March 1993

List of Designated Wildlife Crossings; Drawings AL-00-G100, Sheets 1, 74, 81, 110-119, 121, 126

SCADA Index of Publications

RPVs Inspected in 1992-1993, Pipeline and VMT, dated 9/9/93

1993 Ground Surveillance Reports for PS 1 and 2 areas, 1993 Weekly Aerial Surveillance Reports for Pump Stations 1 and 2 areas, 1992 Weekly Aerial Surveillance Reports for Pump Stations 1 and 2 areas, 1993 Security Line Walk Data for Pump Station 1 area, 1993

Ground Surveillance Reports for Pump Stations 10 and 12 areas, 1992 Ground/Weekly Aerial Surveillance Reports for Pump Stations 10 and 12 areas and 1993 Security Line Walk Data for Pump Stations 10 and 12 areas.

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1993 Belowground Monitoring Report and Monitoring Rod Surveys

PWR PP 5949 Feasibility Study Transmittal, MLR#2 Refrigeration and Settlement, PWR P 5949 (A087), MLR#2 Refrigeration and Settlement Final Design (Summary only), Monitoring Rod Surveys.

As-Built Data Base, dated 4/2/93

Handbook of Pipeline Surveillance (Geotechnical Aspects), dated April 11, 1977

Final Report, Engineering Process Improvement Study Team, dated December 23, 1992.

Memo from C. Fay to R. Shoaf, dated September 17, 1993 describing: Class a Drinking Water Testing Results for all pump stations and the Terminal, covering the period of Fourth Quarter 1991 through Fourth Quarter 1992

Memo from C. Fay to R. L. Allen, D. A. Bickmeier, re: Pump Station 6 water Well Information and Analytical Results dated August 31, 1993.

PWR X033 inspection program, procedures and related specifications

Pressure Vessel inspection program, procedures and related specifications

PM's and procedures and installation criteria for LEFMs

"Keeping You Posted" #243 and 244, and the distribution of these FAR Process Document (procedure)

One year meteorological monitoring data PS 6 Guard Shack

Grounding Scheme for PS 6

JPO Mainline Cathodoic Protection Monitoring Report

Non Conformance reports numbered 39000 through 39043.

Projects Orientation Manual, Pump Station 01, 1993 Construction

Required Manuals/Reference Material Checklist for PS 1

Oil Movements and Operations Support Reference Manual, dated July 15, 1993

Documents Received From Alyeska
BLM/QTC TAPS Audit September/October 1993

(continued)

Alyeska letter to Joint Pipeline Office dated September 3, 1993, Letter No. 93-5353 re: Pipeline Curvature and Corrosion Monitoring and Evaluation

Memo from Keith Heffiner to R. I. Shoaf dated September 20, 1993 re: Safety System

Tank inspection program plan, including past and planned schedules specifications and procedures relating to program API 653
Procedure related to 10% flare directive

Flare pilot thermo couple for past 2 years

Standard Operating Procedure for flare system

Venting procedures for Tank 160

PM's on 20T2 Valve

Standard Operating Procedure for Topping Unit

Lab Test on Water

PM's on Garrett Generators

Any PS specific training lesson plans for PS 6

Open Work Orders at PS 6

Cathodic protection system design criteria and cathodic protection

Procedure describing "Lessons Learned" program outlining how it is implemented, tracked and closed

Quality Assurance Surveillance Report No. 93-KWG-039, dated 8/31/93

Non Conformance Report no. 20,052

As Built Specifications and Drawings package submitted to Dingel Staff on July 13, 1993

Design Change, Loading Arm Repair, dated 11/10/89.

Exempt Position Description, Engr., Document Control Supervisor, dated 3/19/92

Documents Received From Alyeska
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Job Description - Technical Writer, dated 2/16/92

Job Description - Administrative Assistant, dated 12/8/92

List of Alyeska Manuals with Review Mandated by Regulations, dated 9/21/93

Pump Station System Information Manual, SIM 99, Schedule and Status

Pump Station System Information Manual (SIM), Volume 1,. Table of Contents and Glossary, revision 4, dated July 31, 1993

Revision tracking a Report for MR. 48 and FG 78

Style and Procedures Guide, rev 3, dated May 27, 1993

Samples of Procedures

CP rectifier data (extract from vendor's catalog)

Cooperative Program Agreement, dated March 27, 1992, including Appendix A, Corrosion Control Plan

TAPS Mainline Corrosion Protection System Overview, dated 6/18/93

Corrosion Control and Monitoring, 1992 Summary Report

Discrepancy Reports 2784 and 2785, dated 12/5/89.

Copy of Paul Lott's Resume

Copy of QA/QC Manuals

Copy of Contract TAPS 5751 "Exhibit B"

Copy of Guidance to Field Inspectors Including Electrical

Sample of Supplier Qualification

Copy of Calibration Procedures & Record Database

Organization Chart (Draft Only)

Handling Packaging and Shipping Procedures

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Audits of Surveillance's

Transition Meetings, QA/QC Notes and Action Items

Notes Relating Use of APSC QA Program

QA Surveillance

IS 47 Training and Course Outline

P.M. 40-EE-EMERG LT 6 SYS C.

P.M. 40-EE-29

P.M. 40-TK-JET-1

P.M. 40-TK-JET-1A

P.M. 40-CRUDE VALVES

P.M. 40-20-FUEL VALVES

P.M. 40-20-FUEL VALVES

P.M. 40-20-FUEL VALVES

P.M. 40-BALL VALVE CAMERON

Training Roster - Warm Recovery of Topping Unit SOP

Training Roster - Contractor PSM Orientation P-6957

Safe Operation Committee PS 10 40-PSV-05B Modification

Course Description - Topping Unit Training sec. 8.1.7 & 8.1.17

PSM Management of Change Checklist

Topping Unit Relief Valve Emission Impacts

PS 6, 8, 10 Topping Unit Atmospheric Relief Status Report

PROFS - Ross Oliver - Cruide Feed Shutdown

PROFS - Pat Wilson - CTU

PROFS - Ross Oliver - Topping Unit Status Update

(continued)

PROFS - Ross Oliver - Topping Unit Changes PS 10-

PS 10 40 PSV-05A Modification

Fax from: T. Chapman PS 8, to T. Connly PS 10 - Ranges for 7500 BPD

Removal of Blind at Valve 320C Main Line Pump 40-MP-3 X033/P-6369 PS 10

Valve List Rev 0, 5/4/93 Tank 200 Isolation, drain Down & Recommissioning X033/P-6369 PS 10

Blinding at Valve 120C, Mainline Pump 40-MP-3 X033/P-6369 PS 10

Blinding at Valve 220C, Mainline Pump 40-MP-2 X033/P-6369 PS 10

Blinding at Valve 320C, Mainline Pump 40-MP-3 X033/P-6369 PS 10

Removal of Blind, Valve 120C, Mainline Pump 40-MP-1 X033/P-6369 PS 10

Removal of Blind, Valve 220C, Mainline Pump 40-MP-2 X033/P-6369 PS 10

Valve List Rev. C, 4/19/93 Tank 200 Isolation, drain Down & Recommissioning X033/P-6369 PS 10

Tank 200 Pumpdown Estimate Using Tank 2098

Removal of blind, Valve 120C Mainline Pump 40-MP-1 X033/P-6369 PS 10

Blinding of Valve 120C, Mainline Pump 40-MP-1 X033/P-6369 PS 10

Blinding a of Valve 320C, Mainline Pump 40-MP-3 X033/P-6369 PS 10

Draft - Tank 200 Isolation, Drain Down & Recommissioning

X033/P-6369 PS 10 Tank 200 (40-TK-1)

Pump Station Control Room Operator Proficiency

Tank's 207/208 Isolation, Drain Down & Recommissioning X033 PS 10, Tank 207/208 Project Valve List

(continued)

Draft A Tank 207 Isolation, Drain Down & Recommissioning X033 PS 10, Tank 207 (40-TK-7)

Memorandum - PS 10, Tank 200 Inspection Draft Isolation & Drain Down Procedures

Draft - Simplified Mechanical Flow Diagram, PS 10 for Tank 200

Isolation Sketch P-6369 PS 10, Tank 200 (40-TK-1)
Tank 200 P-6369 (Draft)

Draft - Blinding of Valve 120C, Mainline Pump 40-MP-1 X033/P-6369 PS 10

Draft - Removal of Blind, Valve 120C, Mainline Pump 40-MP-1 X033/P-6369 PS 10

29 CFR 1910.119 Process Safety Management of Highly Hazardous Chemicals

PSM Report

Process Safety Management

20 CFR 1910.119 (L) Management of Change

PSM Standard Implementation Benefits of Operations

Pipeline Department File Index

Alyeska Pipeline Service Company Mandatory Training Planner

Required Manuals/Reference Material for PS 10

Matrix - Southern District Oil Spill Training 1993

Memorandum - Pipeline Operations Planner

Required Manuals/Reference Material for PS 10

PS 10 Topping Unit Qualification/Dis/001 Checklist A-Shift

PS 10 Personal Roster & Work Chart

Cable Technology Laboratories Inc. (Weeping cables)

Misc. Weeping Cable Information

Documents Received From Alyeska
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(continued)

Mike Prevost Pressure Relieving Device Manual

Cold Work Permit - Clean Elec. Cables for Inspection Purposes and Samples

Inspection Procedure List - D. Arnaldo

Training Roster for Work Permits, Safety 9/12/93

Review Documentation, July 1993

Cold Work Permit 9/11/93

Drawing D-40-C520 Pipe and Actuator Support

Material Transfer Notice AMF 101 150601C

Work Order OCRP 2097

Pipeline Department SOP Index

Corporate Policies A-13.00

Corporate Management Operating Procedures A.13.00.02

T/U Relief Capacity Increase - P6957 PSV Certifications

Pipeline Operations Work Order Reporting System Self-Paced Instruction Guide, Ver 1.0, dated 11/92

POWOR - Pipeline Operations Work Order Reporting System, Quick References Guide, Ver 1.0

Right-of-Way Lease, State of Alaska

Closed Discrepancy Report Log, dated 9/3/93

Pipeline Operations (OCC) Course Video

Pipeline Status Sheet

Maintenance and Repair Manual, MR-48, Rev 5, dated July 15, 1993

Aerial Topographic-Ortho Photo Plan, for PS 1, 6, 10 and Valdez Terminal

(continued)

Dwg. No. D-31-L601, Rev 4, Sheet 1
D310L601, Rev 1, Sheet 2
D-36-L601, Rev 3, Sheet 1
D-36-L601, Rev 1, Sheet 2
D-40-L601, Rev 3, Sheet 1
D-40-L601, Rev 3, Sheet 2
D-40-L601, Rev 1, Sheet 3
D-40-L601, Rev 1, Sheet 4
D-40-L601, Rev 1, Sheet 5
D-50-L601, Rev 3, Sheet 1 - 10
D-50-L601, Rev 2, Sheet 11 - 19

As-Built Drawing Computer Listing for PS 1, 6, 10 and Terminal

Design Specifications:

Summary Sheet describing enclosures

Engineering Department Specification Listing

Specification Revision & Consolidation Project Listing, dated 9/3/93 Book Manager Read at Alyeska, dated 2/1/93

Technical Specifications C-475, C-420, C-510

Trouble Ticket Excerpts, 10/92 - 3/93, Pipeline Valdez Terminal and Bragaw Maintenance

Draft Organizational Chart, Alyeska Pipeline Service Co., dated October 1993

Documents related to Arctic Grade Electrical Cable Sweating and U/L Listing submitted to Dingell Staff in May, 1993.

Section 4.6.2.1, Portable Containers, (excerpt from Corporate Safety Manual SA-38) regarding program to control transient combustibles

Profs from Andy Postishek, dated 9/16/93 regarding placarding at Pipeline facilities

Engineering Department Manual, ER-68, dated February 15, 1991. This manual is currently being revised; with an expected completion date of December 31, 1993

Engineering Department Manual, ER-68, dated February 15, 1991.

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This manual is currently being revised; with an expected completion date of December 31, 1993.

Air quality Control Permit to Operate, 11/19/74, for PS 6

Extension Air Quality Control Permit to Operate for Pump Station 1, 3, 4, 6, 7, 8, 10, 12

Minimum Levels for PS 6, 8, and 10

Operation of Automated 414 Valves

Preventive Maintenance Instruction's and Procedures, Rev 5, page 7 of 56

Memo from J. D. Norton to Jerry Everard, dated September 24, 1993 Re: Mandatory Inspection Points - BWT Project.

Closed Discrepancy Report Log, dated September 27, 1993

Documents re: RGV 98:

Memo from G. Dupree to K. Robinson, dated June 30, 1993 Re: 6/29/93 Incident at RGV 98

Profs from R. Morgan to T. Egley, dated 6/30/93, Re: RGV 98 Failure

Incident Report, dated 6/30/93 Re: RGV 98

Profs from Bob Hillyer, dated 7/14/93, Re: RGV DC to DC Converters

Pipeline Operations Work Order Reporting System, Work Order Details, Work Order No. 35000677, Status Date 8/3/93 Re: DC to DC Converter

Profs from D. Simmons, dated 8/6/93 Re: RGV DC to DC Converters

Profs from R. Mendes to D. Hillyer, dated 7/26/93 Re: RGV DC to DC Converter

Profs form D. Cole, dated 9/14/93 Re: 1992 RGV Checklist Close Out

Profs from D. Bickmeir, dated 9/14/93, Re: RGV Ground Faults in July

Profs from W. Tonkins, dated 9/24/93 Re: RGVs 98 and 98A

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Documents Re: RGV 98A:

Memo from G. Dupree to K. Robinson, dated June 23, 1993 Re: 6/22/93 Incident at RGV 98A, Resulting in Pipeline Shutdown

Document Titled "6/22/93 Incident at RGV 98A Resulting in Pipeline Shutdown

Memo from R. A. Elliott, dated July 9, 1993 Re: RGV Status Review

Incident Report, dated 6/22/93

Profs from B. Johnson, dated 6/22/93 Re: Mod. to RGV 98A and RGV 97 status wiring

TAPS Relief Tank Venting Risk Assessment for APSC, 9/93

Crude Characterization Study final report, dated 12.92

Emergency Contingency Action Plan, PS 6, EC 71-6, dated 5/20/93

Waste Management Manual, HZ-70, Rev 0, dated August 31, 1993. See Appendix A, Waste Management Guidelines, for reference to batteries.

Electrical Isolation of Marine Terminal Loading Arms package submitted to Dingell Staff on July 13, 1993.

QA/QC organization charts, dated July 6, 1977 to January, 1990

Flare System Drawings:

D36-M305 Sht 1
4-0722-6-4
4-0722-1-6
4-0722-2-4
4-0722-3-3

Engineering evaluation for 4" sump discharge pipe movement at PS 6

Mandatory Training - August 93

History of leaks and spills 77-93

Leak Detection - Leak Detection White Paper 7/9/93

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Materials for H_2S Analyzers

Materials Services Policies and Procedures.

Engineering Procedures List (9/23/93), EM-68

Memo from R. G. Wolk, dated September 20, 1993 re: Departmental Procedures

Alyeska Pipeline - TAPS Life Cycle Model

Engineering Design Guidelines, ED-120, Rev 0, dated June 18, 1993

Desk Procedures, Project Administration Clerk, as of October 1992

Drawing Nos.: D-30-E132, rev. 3, Sheet 1; D-30-E-132, Rev 6 Sheet 2; D-30-E-132, Rev 2, Sheet 3

Organization Chart, Materials Services, Contracts, dated April 1993

Exempt Position Description, MATs Mgr. Contracts, dated 1/21/91

Job Family Descriptor: Materials Services Support, dated 9/14/93

Job Family Descriptor : Secretary, dated 12/8/92

Job Family Descriptor: Administrative Assistant

Contract TAPS/5165 between Fluor Daniel and Alyeska Pipeline Service Company, dated 7/16/91

Amendment No. 1 to Contract TAPS/5165, dated August 10, 1992

Documents regarding Valdez NEC Compliance project
Work Orders to correct NEC violations. Work Order Nos. V114663-V114667, V9114673, V114674, V114675, V114679, V114680, V114692-V114694, V302101-V302108, V302111

Contract TAPS/5128 between Price/Ahtna, J. V. and Alyeska Pipeline Service Company, dated 2/26/91

Master Time Charter Party for Escort Vessels, TAPS/5539, dated 9/22/93

Air Quality Control Permits to Operate for Pump Stations 1-4, 6-10, 12 and Valdez Terminal together with letter from State of

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Alaska, Dept. of Environmental Conservation, dated July 20, 1993, extending expiration date of permits.

Exempt Position Description, C&ML Purchasing Manager, dated 10/28/82

Exempt Position Description, C&ML Purchasing Admin. Supv., dated 1/16/84

Draft copy of Trans-Alaska Pipeline, Surveillance Procedures and Monitoring Methods,, MS-31-4, Second Edition, dated March 29, 1993.

EWR T-5343.B, Valdez Marine Terminal Rockbolt Replacement

Terminal Rockblot, Golder Associates, Inc., dated July 29, 1992

Draft of Alyeska Pipeline Service Company, TAPS Tank Guide, TP-117, Rev 0,undated.

Hazardous Material Management Procedures, dated 4/15/93

Fluor Purchase Order, T-445907-6-0061 with Cerro Wire and Cable Company

Alyeska Pipeline Service Company/Fluor Engineers Specifications SP-4459-60-61 and SP4459-60-62

Certified Test Reports

Material Certification Audit

List of QA-36, Rev. 7 Distribution List

Audit Checklists 91-PT-01
Audit Checklists 91-AE/HJR-02
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Audit Checklists 93-A03
Audit Checklists 93-A04
Audit Checklists 93-A05
Audit Checklists 93-A06
Audit Checklists 93-A08
Audit Checklists 93-A09

Copy of QA-36, Rev A, undated

Copy of QA Organizational Development

Matrix on QA-36, Rev 5, undated

Matrix on QA-36, Rev 7, undated

PWR #4517, BWT Tankage Improvements, Post Construction Documentation

Excerpts from ASME B31.3 that addresses welding of pipe lined with nonmetals together with report "Summary of Cement Lined Piping Allegations by Schooly"

Job Family Descriptor: Administrative Assistant, dated 9/17/93

Section 7, As-Built Documentation, Rev 9, February 1, 1993

Appendix D - Design Drafting, Engineering Design Guidelines, Rev. 0, dated 6/18/93 (From ED-120)

Alyeska Master Specification, G-501, Alyeska Drawing Standards, Rev 2, dated 10/16/92

Valdez Terminal Pre-Fire Plans, VP-91, dated March 31, 1992

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Earthquake Monitoring System, OCC Operations Manual, EM-50, dated April 1980

Earthquake Monitoring System Checklists, Appendix to EQ-49 and EM 50

Trans-Alaska Pipeline Earthquake Monitoring System, Pump Station Operations Manual, EQ-49, Rev 2, April 24, 1981.

Alyeska Marine Terminal, Ballast Water Treatment Facility Operating Manual, BW-19, Rev 0 dated July 21, 1993

Alyeska's Substance Abuse Policy and Drug Testing Procedure, Rev 1, No. E-800.002, dated 8/16/93

Drug Awareness Behavioral Observation Training for Supervisors

Drug Testing Collector Training

Alyeska Drug Testing Statistics

Alyeska Contractor Consortium Drug Testing Statistics

Anti-Drug Program Semiannual and Annual Report Format Used in the Audit Process

Evaluation of Operator's Drug Testing Program, Part 40 - Medical Review Officer Inspection Form, Part 40-NIDA Lab Inspection Form, Part 40 - Collection Site Inspection Form and Evaluation of Operaor's Drug Testing Program Field Inspection Unit/Location Form. These sheets are used to audit Alyeska's drug testing program and the contractor drug testing program. Also, the same forms are used by DOT to audit drug programs.

Vapor Recovery Operating Manual, Alyeska Marine Terminal, TV-18, Rev 0, dated May 26, 1993

Ground and aerial surveillance reports for areas around Pump Stations 8 and 9 for the period 1990 to 1993

Failure Analysis of removed piping

Analysis of Failure in DRA Tanker #5008, 3/31/88

Investigation of Broken Nipple at PS 3, 8/8/90

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Failure Investigation of Cosasco Fitting Connections, 6/4/91

Analysis of Leak in High Pressure Fuel Filter, 3/11/92

Controlling Emissions on Topping Units

Air Quality Control Permits to Operate PS 6, 8 and 10 - State letter dated 9/21/90 to J. B. Hermiller from W. D. McGee

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Controlling Emissions on Topping Units (Cont.)

Alyeska's H_2 S Alternative Monitoring Plan Proposal, 8/2/93

Water Draw

D36M1/M205 Rev 15 Sht. 3

D36M303, Rev 1 Sht. 10

P4381 Fire Truck Foam Connection, 3/3/92

Strapping list for 36 TK1 - Image Table

Profs message, R. Elliott to J. V. Everard, "BLM Audit Question About Tank Cleaning"

Technical Specification P.515 Instrument Piping Material Classification 4/7/92

Field Trial Draft, Process Safety Management Compliance Manual, First Edition, Rev 0 dated October 1, 1993

Excerpt from Pipeline Spill Prevention and Response Plan, HB 567 Supplement to CP-35-1, Rev 0 dated August 12, 1992

Engineering Evaluation of Selected Welds in the Trans-Alaska Pipeline Final Report, Magnetic Particle and Ultrasonic Inspection of Remedial Weld Repairs on Inside Pipe Surfaces, dated September 1977, prepared by Southwest Research Institute

Excerpt from Alyeska's transmittal to The Honorable George Miller, dated August 4, 1992 re: Test procedures

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US. Department of Interior Memorandum with cover letter, dated June 19, 1977 re: "Trans-Alaska Pipeline Weld Quality.

Shift Work Logs, Protective Devices Test Reports, Cold Work Permits profs and memorandum from Pump Station 2, 3, 4, 5, 6, 7, 8 and 9 re: Maintenance performed for pressure vessels during 1992.

PM 36 TK-1

NGLs in pipeline causing improper venting/flare capacity

PSM Management Change Checklist

PS 6, 8 and 10 Topping Unit Atmospheric Relief Vent

PWR 6957 Increase Topping Unit Relief Capacity PS 6, 8 and 10

Seismic Design Criteria for Mechanical and Electrical Equipment, 3/18/91, J. F. Johnson to J. C. Swinburn

APSC Technical Specification 30-19, "Seismic Design Criteria for A/G Structures - Simplified Static Approach", 5/3/93, Rev 4

Fluor Speicification SP-4684-30-20, "Seismic Design Criteria for A/G Structures Dynamic Analysis Approach", 8/29/79, Rev 1

Fluor Specification SP-4684-30-14, "Seismic Design Criteria for Certain A/G Facilities", 10/6/78, Rev 4

Criteria and Design Bases Appendices, Volume 2, "Summary Report Basis for Earthquake Design for the Trans-Alaska Pipeline System", A-3.1051A, September 1973

Seismic Design Criteria for Certain A/G Faciliteis, 3/19/75, by Nathan Newmark

Cargo tanker maintenance and inspecition program.

Project 5779 Reconstruct Fuel Islands PS-3 Inspection Reports.

State of Alaska Certification for PS 6 heat exchangers for the yreas 1986 and 1990

Documents re: RGV #73

Safety Related Conditions Report, dated Aughust 13, 1992,

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Alyeska Letter No. 92-9730-G

Safety Related Condition Report, dated August 20, 1992, Addendum to Letter #92-9730-G, Alyseka Letter No. 92-9758-G

Document titled "Remote Gate Valve (RGV) #73, dated 12/8/92

Final Order, Dept. of Transportation, CPF. No. 52511

Typical welding package for installation of a mainline repair sleeve

Preventative Maintenance Satatus. This maintenance inquiry is on Machine #3678, which is a 1990 Lincoln 250 AMP Welding Machine. It is indicated on this document that the output of voltage and amperage for Welding is checked to the manufacturer's recommendations at least every 365 hours of usage

Filler metal control

IS-47 Interpretations 1 through 33

Information Systems Ofdice Proucts, Verson 1

Memo from R. Wolk, dated October 6, 1993 re: Electrical inspection at PS1 fuel gas island

Standard Inspection Procedure, T-001, for Bulk Storage Tanks, Rev 0

Standard Inspection Procedure, T-002, for Bulk Storage Tank Pressure/Vacuum Valves, Rev 0

Quality Services Department, Pressure Vacuum Valve Inspection Plan for Pipeline Operations, dated 6/18/93

Quality Service Department Registered Pressure Vessel Inspection Plan for Pipeline Operations, dated 9/29/93

Quality Service Department Registered Pressure Vessel Inspection Plan for Valdez Marine Terminal, dated 6/18/93

Quality Service Department Registered Pressure Vessel Inspection Plan for Pipeline Operations, dated 9/29/93

Quality Service Department Registered Pressure Vessel Inspection Plan for Valdez Marine Terminal, dated 9/29/93

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Quality Service Department Unregistered Pressure Vessel Inspection Plan for Pipeline Operations, dated 8/31/93

Quality Services Department, Unregistered Pressure Vessel Inspeciton Plan for Valdez Marien Terminal, dated 8/31/93

Quality Services Department, Above Ground Bulk Storage Tank Inspection Plan for Pipeline Operations, dated 6/18/93

Qual;ity Services Department, Above Ground Bulk Storage Tank Inspection Plan for Valdez Marine Terminal, dated 6/28/93

Corporate Quality Assurance Status Report, dated August 30, 1993

Corporate Quality Assurance Audits and Surveillance Status Report, 4th Quarter 1992

Additional QA organization development charts to supplement prior package.

Sample of the process for a River and Floodplain repair for initial observation to close out: Project - P5943, Hess Creek Bank Erosion Study (MP 378.7)

Memo from R. J. Williams to K. M. Peacock, dated December 28, 1990 re: 1990 River Surveillance (see page 5)

Memo from D. T. Hisey to K. M. Peacock, dated December 20, 1991 re: 1991 River Surveillance (see page 4)

Memo from D. T. Hisey to K. M. Peacock, dated April 24, 1992 re: Feasibility Study EWR P5943, Hess Creek Bank Erosion, MP 378.7

Hess Creek Bank Erosion Study, Pipeline Milepost 378.7 dated April 1992

EWR P5943, Hess Creek Bank Protection at MP 378.7, 1993 Budgeted Capital Project, Final Design, September 1992

Alyeska letter to Jerry Brossia, dated September 8, 1993, Alyeska Letter No. 93-5362 re: Hess Creek Bank Stabilization, PLMP 378.7

Mainline Pipe Investigation Report, dated October 10, 1990, Milepost 106.97

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Mainline Pipe Investigation Report, dated July 30, 1992, Milepost 53774

Draft, Surveillance and Monitoring Manual, Valumes 1 and 2 dated October 6, 1993.

Welding Manual, WL:-51

Documents of other Alyeska programs that illustrate how the welding program is implemented

Profs from Dean Carson, dated 10/7/93 re: piping in the Fire Foam System

Pump Station System Information Manual (SIM), Vol. 10, Sec. 3.7 Leading Edge Flow meters (LEFMs), dated July 1 1992

Pump Station System Information Manual (SIM), Vol. 32, Sec 7.7 PS 1 Metering Control, dated July 1 1992

Pump Station Information Manual (SIM), Vol 33, Sec 7.8 Digital Strong Motion Accelerogaph, dated July 1992

Pump Station System Information Manual (SIM), Vol 39, Sec 9.5 PS 1 Metering, dated July 1, 1992

Pump Station System Information Manual (SIM), Vol 41, Sec. 9.7 Vapor Recovery, dated July 1, 1992

Package 1: Contract TAPS/5497 with K&W Transportation Company for fuel transportation, K&W's (Anderson Trucking) DOT Safety & Fitness Programs, Alyeska on-site reviews and responses and Alyeska contract administration being turned over to M. E. Kopp, Oil Movements.

Package 2: Contract TAPS/5309 with Alaska Pacific Transport, Inc. for DRA Transportation, APT's DOT Safety and Fitness Programs and Alyeska's on-site review and audit.

Package 3: Contract TAPS/4752 with Progressive Transport, Inc. (Previous contract) for fuel transportation and Alyeska's informal review note on PTI's operations.

Package 4: Contract TAPS/4251 with Alaska Pacific Transport, Inc. (Previous contract) for DRA transportation

Package 5: Alyeska Logistics/Transportation Unit job

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descriptions, Alyeska's Draft Quality Motor Carrier Review

Process, Specific Objective LO-3, dated July, 1993 aand Materials Services Department Operating Procedures.

Operational Directive, Pipeline MNT-06, dated 11/13/92 re: Pipeline Operations Work Order Report (POWER) System

Pipeline Operations Work Order Reporting System, Self-Paced Instruction Guide, Ver 1.0, dated November 1992

Quality Program, Course No. QA 002.

PWR T4917

Memo from R. G. Wolk dated October 8, 1993 re: Project 5779, PS 1 Fuel Gas Handling

Technical Specification B-432, Tape Wrapping of Underground Steel Pipe, dated 6/.12/92

Pump Station Cable Trays:
Draft memo from B. Babcock to J. Everard, dated 10/6/93 re: PS 1 and 8 Cable Tray Inspection

Letter from D. J. Nyman to J. Eerard, dated October 6, 1993 re: Seismic Integrity of Cable Tray Systems at TAPS Pump Stations

The Current PM Program and How It Is Evolving:

Preventive Maintenance Manual

Preventive Maintenance Manual, Rev 0, dated November 1, 1993

Quality Services Department and Arctic Slope Inspection Services:

NDT Instruments Quality Control Manual, Sec. 7.0, dated 1/16/92 re: Manufactured Products Inspection System

Krautkramer Branson Quality Policy, dated May 7, 1992

Contract TAPS/5751, Scope of Work, Exhibit B., page 6 of 13

Resumes of Lee O. Adams, Frank Yanegi, George W. Stewart, Ellen B. Mannion, Larry L. Coffman and Walter D. Glover

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Message from Tricia Vail, Arctic Slope Inspection, dated 8/30/93 re: Limitation on Authority and Role of the Functional Specialists Directed to You by Paul W. Lott and Robbie Robinson

IS-47, Third Edition, Rev 0, Organization and Responsibilities, dated 2/1/93, Page 3 of 6 Section 1

IS-47, Third Edition, Rev 0, dated 2/1/93, Qualification/Certification of Inspection Personnel. Sec. 6

Alyeska letter to P. Lott from R. Wolk, dated May 21, 1992 re: Quality Assuracne Audit 92-A09 of ASIS, Inc.

Alyeska letter to P. Lott from R. Wolk, dated June 1, 1992 re: Reschedule of Quality Assurance Audit of ASIS, Inc.

Arctic Slope letter to R. Wolk from P. Lott, dated September 24, 1992 re: Response to QA Finding

Alyeska letter to P. Lott from R. Wolk, dated February 11, 1993 re: QA Audit 92-A09

Contract TAPS/5373, Exhibit B, Scope of Work and General Requirements for Nondestruction Examination Contractors, dated 5/12/93

Quality Assurance Department Audit Schedule,. dated 7/15/93

Status of Girth Welds on the Trans-Alaska Pipeline:

Memo from J. Norton to J. Everard, dated October 9, 1993 re: Corrosion Detection at Girth Welds

Letter from B. Stickler to T. Coghill, dated October 7, 1993 re: Girth Weld Corrosion

Program for Standard Operating Procedures at Pump Stations and VMT

Listing of Pipeline Department Standard Operating and Maintenance Procedures, Sections 2 through 10

Table of Contents for Oil Movements and Storage, Safe Operating Procedures; Ballast Water Treatment, Safe Operating Procedures; and Power/Vapor Recovery, Safe Operating Procedures

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Task Performance Checklist, Level I, Subject: Academics, Task #2, re: Complete Technician Basic Training, dated August 1, 1990

Memo from S. W. Jones to D. Rees, dated October 5, 1993 re: Training Issues

PSM Management of Changes - From 7019 for Topping Unit Chemical Injection System for PS 8 re: Add 3 Chemical Injection Systems to Topping Unit - WALCO 5196 103 and 3842, dated August 24, 1993

Warehousing/Material Handling:

Materials Services, Department Opeating Procedure, dated 6/24/93, No. B-8.01.12 re: Material Storage and Handling

Pipeline Insulating Bonnets Touching VSM

Heat Pipe Vibration

Civil -- "Acoustic Sensors":

Pipeline Operations Work Order Reporting System, Work Order Details, PS 6, dated 10/5/93

Capability to Perform Electrical Work:

Mandatory Training Program, Matrices and Course Descriptions, Safety, Fire, Environment, Licenses and Certifications, Technical,

Incident Response, dated 3/93

Loading Arm Resistance Testing

Compliance Status of Effort and Training of Personnel:

Alyeska Pipeline Service Company, Valdez Marine Terminal, NEC Compliance Project, Project Status, October 1993

Ship Escort Response Vessel System

As-Built Specifications Drawingss:

Document submitted to staff for the Oversight and Investigations Subcommittee re: As-Built Specifications and Drawings

Memo from B. Elliott and B. Schoff to J. Everard, dated October 7, 1993 re: Tank Design Seismic Criteria

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Anchorage Staff Support for Operations

Terminal Work Order Procedures 11/4/91

Mechanical SOPs/S.M.P:., Valdez Terminal

Arctic Slope Inspection Services, Resumes and Qualification of Inspectors

1991 and 1992 closed Surveillance Reports for Valdez Marine Terminal Fairbanks, Anchorage, Pipeline General, Pump Stations 1 - 12

1993 Surveillance Reports closed for Pipeline General, Pump Stations 1 - 12, Valdez Marine Terminal and Projects

1993 Surveillance Reports open for Pump Stations 1 - 12, valdez Marine Terminal, Other, Anchorage

Surveillance Report Log

Description of Adjunct Inspectors including Quality Standard No. 13.1 (refer to Page 3 of 3) and Quality Services DOP-016, Draft C

Description of Alyeska's Materials Bar Coding System, including General Description - W.I.P. Materials Mini Warehouse and Materials Services DOP numbfers B-8.01.01 and B-8.01.03

Profs from P. McDevitt, dated 10/8/93 re: Monitoring of Amperge and Voltage during the welding process

Documentation re: Federal and State regulations and industry standards, and codes that address welding in TAPS

Training for Trainers Workshop, undated

Mandatory Training Planning and Reporting, System User's Guide, dated April 5. 1993

1993 Mandatory Training Planner

Group A - Pipeline

Group B - Terminal

Group C - Operations

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Group D - SERVS

Mandatory Training Matrices and Course Descriptions, dated 8/93

Memo from Alyeska Training Committee, dated September 18. 1992 re: Guideline for Mandatory Training

Technical Training and Administation: Roles for Manager, Trianing Coordinator and Senior Administrative Assistant, undated

Training Roster showing Safety Manual review

Statement on Audits plus Samples in response to item #1 of 9/17/93 request from QTC

Memo from R. Schoff with attachments dated October 8, 1993 re: Information on six (6) typical motor valves

Letter from C&D Batteries Division to Alyeska Pipeline Service Company, dated 6/16/75 re: Transmitting drawings and data for review and approval

Drawing Nos. K-6042, K-6044, K-6066

Alyeska/Fluor Specification SP-4459-60-79, General Specification for Batteries and Battery Racks, Rev 2, dated 9/30/74

Alyeska/Fluor Specification SP-4459-40-3, Seismic Design Criteria for Category 1 and 2 Mechanical and Electrical Equipment, Re 6 dated 6/12/74

Wyle Laboratories, Seismic Simulation Test Program on KC and LC Battery Cells for C&D Batteries Division, Plymouth Meeting, Pennsylvania (Fluor Specificaation SP-4459-40-3), Test Procedure No. 541/3533/ES, dated 1/20/75

Wyle Laboratories, Seismic Simulation Test Program on KC-7, KC-9 and KC-13 Battery Cells, dated 6/17/73

Alyeska letter to C&D Batteries, dated 9/14/73 re: Design of battery rack meeting Alyeska's Specification

Drawing Nos. M-6512, M-6543, M-6511, K-5379 (3)

Mechanical Catalog Microfilm Users Guide

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Design Change Control - Engineering Design Guidelines - Rev 0 6/18/93

Equipment Calibratioon and Control

PM Program for ESD of berths: 75-F-0661; 75-HU-3 and message from T. Plummer

P&CM Training Program Course Map, dated September 8, 1993

P&CM Training Program Modules 0-15 through 0-36, dated September 10, 1993

Criterion - Referenced Instruction: Analysis, Design, and Implementation Course Manage Manual, Third Edition

Criterion - Referenced Instruction: Analysis, Design, and Implementation Course Control Documents, Thirt edition - 1992 Revision

Description of Valdez Terminal OCC Computer (Seismic Installation) dated October 9, 1993

June 1993 Fire Water Pump Test

1989 and 1990 Capital and Expense Projects listing of corrosion projects

Aerial photos of Stevens Village POL Storage Area

Excerpt from EM-68, Engineering Manual; Engineering Procedures List dated 10/4/93

Miscellaneous Issues: "No Master Equipment List

Miscellaneous Issues: "No Critical Equipment List for Emeragencies

Fuel/Gas Line Contingency Items at PS 3

Contingency Repair Equipment (REV 7/9/92

Pipeline Contingency Equipment

Yukon River Contingency Plan, October 1983

Alyeska Pipeline Bridge Contingency Plan, dated March 1983

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Miscellaneous Issues: COTU Valves Stacked without Labels and Labeling Too Haphazard

Miscellaneous Issues: Central Matrix Requirements

Draft, Trans-Alaska Pipeline System, Environmental and Operations Oversight Agencies and Regulations, dated 7/8/93

Civil, "Pipeline Touching the VSMs"

Memo from D. Hisey to K. Peacock, dated January 11, 1993 re: P5130A - Treasure Creek A/G Repairs Summary - As-Built Documentation

Summary Report, Aboveground Pipeline Support System for the Trans Alaska Pipeline, Appendix A-3.1014, dated September 14, 1973

Section 1.4.2.2 Pipe Stresses and Section 1.4.2.6 Configuration Layout from Design Criteria, dated September 14, 1973

Alyeska Pipeline Service Company, Split Ring Data Sheets (Samples of reports submitted by maintenance crews)

Profs from R. Reiswig to D. Taylor, dated October 11, 1993

Profs from R. Reiswig to D. Talylor, dated October 12, 1993

Memo from N. Bondy to R. Shoaf, dated October 12, 1993 re: Alyeska Training Philosophy/Summary

Draft Pipeline and Civil Maintenance (P{&CM) Supervisor, Federal and State Agency Organization Hierarchy Required Training and Citation/Authority

Draft learning Guide, Identify and Comply with Federal Grant Row Sections, Stipulations and Regulations, The Agreement and Grant of Right-of-Way for (the) Trans Alaska Pipeline, C-58

Draft Learning Guide, Identify and Define the Role of the Joint Pipeline Office (JPO) Field Monitoring Program, C-57

Draft Learning Guide, Identify the Trans-Alaska Pipeline Authorization Act, C60 and Test

OSCP Training Module Field Audience, dated 4/27/93

Flow Charts, Qualification Program

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Table of Contents and Fact Sheet, System Information Manual (SIM-99)

Memo from K. Peacock, dated February 5, 1993 re: New SOP Manuals

Pipeline Operations Work Order Reporting System, Self-Paced Instruction Guide, Ver. 1.0, dated November 1992

Pipeline Academy Curriculum, Anchorage, DAted 10/1/93

Basic Training Master List

DIS/001 Topping Unit Operator Qualification and DIS/009 Topping Unit Control Panel Operator Qualification

VAP-001 PS 1 Vapor Handling Systems Operator Qualification

Fire Panel Operations Course Map, dated 7/16/93
White Paper: Function of Training in Process Safety Management

DIS/007 PS 10 Topping Unit Desalter

Valdez Marine Terminal Training Strategy 1992-1993

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Memo from D. Hisey to K. Peacock, dated January 11, 1993 re: P5130A - Treasure Creek A/G Repairs Summary - As-Built Documentation

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Alaska Pipeline, Appendix A-3.1014, dated September 14, 1973

Section 1.4.2.2 Pipe Stress and Section 1.4.2.6 Configuration Layout from DesignCriteria dated September 24, 1973

Alyeska Pipeline service Company, Split Ring Data Sheets (Samples of reports submitted by maintenance crews)

Audit finding Reports, Audit No. 91-AE/HJR-02, Finding Nos. 1 through 5, dated 5/4/91

Preventive Maintenance Instructions and Procedures, Rev No 5, dated 3/2/93

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Discrepancy Report No. 002853 re: Visual Inspection of heat trace installed on pipe

Daily Activity Reports prepared by Joe Tracanna, dated 10/18/90 - 10/26/90, 10/28/90-11/3/90, 11/5/90-11/6/90, 11/27/90, 12/2/90 re: cable trays

Memo from J. C. Hassell, dated October 13, 1993 re: PS6 Well Monitoring for Primary and Secondary Inorganic Drinking Water Criteria

White Paper "Is the Pig Program Separate Form the Corrosion Plan?"

Report, Curvature and Corrosion Monitoring and Evaluation, Sept. 1993

Mainline Pipe Investigation Report, Mile Post 106.97, dated October 10, 1993

Mainline Pipe Investigation Report, Mile Post 57774, dated July 20, 1992

Specification B-510, "Mainline Pipe Investigation", Rev 2

Memo from Pipeline Training Section to Pump Station Supervisors, dated July 15, 1993 re: CRO Performance Task Checklist
Contract TAPS/5375 between Norcon, Inc. and Nana Development Corporation, Inc. and Alyeska Pipeline Service Company, dated 4/1/92, including Amendments 1 through 3, covering pipeline and pump station maintenance

Contract TAPS/5376 between Price/Ahtna and Alyeska Pipeline Service Company, dated 4/1/92, including Amendments 1 and 2, covering pipeline and pump station projects

Above ground Pipeline Alignment Program

Mr 48, Section No. 3, Aboveground Support Assemblies

Loadcell Monitoring System Database for 1993

Dept. of Transportation letter, dated January 29, 1993 re: Interpretation of 195.424(a)

Work Order Reports for Norcon and Ahtna

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Contractor Job Safety Analysis for Loadcell-Split Ring Adjustments

BLM letter to Alyeska, dated October 9, 1992, Letter No. TAPS P001.4179 re: Earthquake 10/1/92

Alyeska letter to BLM, dated November 5, 1992, letter No. 92-4751 re: Response to letter TAPS P001.479 with Attachments 1 through 4

Samples from Alyeska Earthquake Monitoring System, Post-Earthquake Data Evaluation, Report Date: 05/13/93

Report on Valdez Tanker Loading Vapor Emission Testing and Evaluation, 10/22/90

Supplement to Report on Valdez Tanker Loading Vapor Emission Testing and Evaluation, Vol 1

Supplement to Report on Valdez Tanker Loading Vapor Emission Testing and Evaluation, Vol 2

Supplement to Report on Valdez Tanker Loading Vapor Emission Testing and Evaluation, Vol 3

Memo from B. Babcock, dated 10/11/93 re: Cable Tray Installation

Alyeska/Fluor Specification No. 4459-60-45, Wiring Methods and Material Selection, Rev. 3, dated 6/73

Example, Existing Cable Load and Sizing Info, PWT T-6925

Drawing No. D-31-E22, Rev 5, Sheet 1

Drawing No. D-31-E380, Rev 6, Sheet 1

Draft memo from C. O'Donnell, dated 10/12/93 re: Flare Flow Measurement

Drawing No. D-31-M77, Rev 8, Sheet 1

Drawing No. D-31-M77, Rev 5, Sheet 2

Operations and Maintenance Manual, EFM Insertion Meters, Tag No. 31-FE-200

Model TR30, Totalizer and Rate of Flow Indicator, Tag 31-FQI-200

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Pictures of battery racks installed in battery room at PS 6

Profs from L. Hale, dated 10/14/93 re: P4787 Batteries and Chargers Seismic Ratings

Vendor seismic qualification information for the new battery racks and battery chargers

Profs form K. Pysz, dated 10/15/93 re: BGattery Room Rack Bolts

Sketches of battery rack installation in the OCC battery room

1994 Firewater Valve Estimate, dated 10/13/93

Post Installation Valve Leak Test Procedure, Firewater System Investigation, dated 10/14/93

List of Firewater Valves replaced in 1991, 1992 and 1993

Alyeska memo from E. L. Monthei, dated 8/3/93 re: Valve L-9 Replacement T6643 Firewater Investigation

Alyeska memo from E. L. Monthei, dated 8/26/93 re: Valve L-11 Replacement, T6443 Firewater Inspection

Alyeska memo from E. L. Monthei,. dated 8/31/93 re: Valve L-26 Replacement, T6443 Firewater Investigation

Profs from J. Whitaker, dated 9/15/93 re: T6443 Summary of Inspection/Repairs at Site 7 Firewater Valve L42

Profs from L. Richardson, dated 9/24/93 re: Summary of Insepction at T6443, Site 13, Valve L26

Profs from L. Richardson, dated 6/25/93 re: T-6443 Summary of Site 5 Segment of Project

Tag No.	Task No.	Tag No.	Task No.
52-FHR-1	180808/M06	53-FHR-4	180808/M06
52-FHR-2	180808/M06	54-P-3A	180388/K06
52-FHR-3	180808/M06	54-P-3A	180388/K10
52-FHR-4	180808/M06	54-P-3A	180601/M01
53-FHR-1	180808/M06	54-P-3A	180901/M03
53-FHR-2	180808/M06	54-P-3AD	181387/Y01
53-FHR-3	180808/M06	54-P-3AD	181388/M06
54-P-3AD	183402/M03	54-V-067M0	180571/K06

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54-P-3B	180388/K10	54-V-077M0	180571/Y01
54-P-3B	180601/M01	54-V-087M0	180571/Y01
54-P-3B	180901/M03	54-V-087M0	180571/K06
54-P-3BD	181387/Y01	54-V-096M0	180571/K06
54-P-3BD	181388/M06	54-V-096M0	180571/Y01
54-P-3BD	183402/M03	54-V-097M0	180571/Y01
54-P-4A	181393/Y01	54-V-097M0	180571/K06
54-PK-1A	180580/M04	54-V-107M0	180571/K06
54-PK-1A	181384/Y01	54-V-107M0	180571/Y01
54-PK-1AM	183314/Y01	54-V-116M0	180571/Y01
54-PK-1BM	183314/Y01	54-V-116M0	180571/K06
54-PSV-5406	181399/Y02	54-V-1216M0	180571/Y01
54-V-016M0	180571/K06	S54-V-117M0	180571/K06
54-V-016M0	180571/Y01	54-V-117M0	180571/Y01
54-V-017M0	180571/Y01	54-V-127M0	180571/Y01
54-V-017M0	180571/K06	54-V-127M0	180571/K06
54-V-027M0	180571/K06	54-V-137M0	180571/K06
54-V-027M0	180571/Y01	54-V-137M0	180571/Y01
54-V-037M0	180571/Y01	58-P-4M	180401/Y01
54-V-037M0	180571/K06	58-P-4	180409/M01
54-V-047M0	180571/Y01	58-P-30CD	181600/M06
54-V-056M0	180571/Y01	58-P-3C	187600/M03
54-V-056M0	180571/K06	58-P-3C	187600/M01
54-V-057M0	180571/K06	58-P-3C	180554/M06
54-V-057M0	180571/Y01	58-P-3C	180388/K10
54-V-067M0	180571/Y01	58-P-3BD	181600/M06
58-P-3BD	181387/M06	58-P-3C	187600/M03
58-P-3B	187600/M03	58-P-3CD	181387/M06
58-P-3B	181600/M01	58-P-3CD	188600/M06
58-P-3B	180901/M03	58-P-4	180409/M01
55-P-3A	180901/M03	58-P-4M	180410/Y01
55-P-3A	180601/M01	58-P-4M	183170/Y01
55-P-3A	180388/K10	58-PSV-5820	181395/Y01
55-P-3A	180388/K10	58-V-401/M0	180562/M06
55-P-3A	180388/K06	58-V-403/M0	180562/M06
54-V-799M0/M0	180571/M06	58-V-404/M0	180562/M06
54-V-798M0	180571/M06	58-V-405/M0	180562/M06
54-V-796M0	180571/M06	58-V-406/M0	180562/M06
54-V-795M0	180571/M06	58-V-407/M0	180562/M06
54-V-147M0	180571/Y01	54-V-147M0	180571/K06
54-V-147M0	180571/Y01	54-V-147M0	180571/K06
54-V-137M0	180571/K06	54-V-137M0	180571/Y01
58-P-3B	181600/M01	58-P-3B	187600/M03
58-P-3BD	181387/M06	58-P-3BD	187600/M06
58-P-3C	180388/K10	58-P-3C	180554/M06
58-P-3C	180600/M01	58-P-3C	180901/M03

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58-P-3C 181600/M01

Paper dated October 15, 1993, describing surveillance and monitoring process for wildlife crossing at Milepost 1.6

Legend to 1992 Curvature Pig Run - mile post 1.6 Wildlife Crossing October 6, 1993

TO-15 Terminal Controller Operations Manual Rev 1 2nd Edition

DO-14 Trans Alaska Pipeline Controller Operating Manual 2nd Edition

Line Volume Balance Leak Analysis Functional Overview 9/20/88

Alarm Sensitivity Distribution Aug 1993

Standard Workmanship Manual QAM001 6/71 ED.

T-4858 Grounding System Test & Repair

Ground Resistance Data Log

Test Stations & Grounding Grids

1993 OPS Weekly Fire & Safety Checklist

1993 BI/Monthly Fire & Safety Checklist - MAR-APR "C"

1993 BI/Monthly Fire & Safety Checklist - MAY-JUN "D"

East Meter Incident/Slack Line

Visting Supervisor Operation Safety Insepction July August 93

PM Task Assignment May - Aug

QU/Mon/WK visit sup Fire & Safety Inspection

50 Maint Supervisor Work Oder List

50 DB Safety Work Order List

Valdez Terminal Preventive Maintenance Performance Summary May 1993

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Preventive Maintenance & Instructions & Procedures Rev 5

P.M. Task Assignments are 73-Berth 3 TAG # 73-LA-1 Task:180296/K08

P.M. Task Assignments are 73-Berth 3 TAg #73-LA-A Task: 180293/K06

P.M. Task Assignments are 73-Berth 3 TAg #73-LA-A Task: 180298/K09

P.M. Task Assignments are 73-Berth 3 TAg #73-LA-A Task: 183605/M01

P.M. Task Assignments are 73-Berth 3 TAg #73-LA-A Task: 180296/M01

VMT Hazop Detailed Report

Preventive Maintenance Project Summary Area 57 OCC/Admin

PM Procedure Change Report

D-50-M601 Rev 1

D-50-M625 Rev 1

D-50-M602 Rev 1

D-50-T3699-M7 Rev 0

D-50-T3699-M4 Rev 0

D-50-T3699-M3 Rev 0

D-50-T3699-M1

D-70-M Rev 1

X-50-E700 Rev 3

D-50-E708 Rev 3

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D-50-E708 Rev 2 Sheet 13

D-50-E708 Rev 1

D-50-E709 Rev 1 Sheet 1

D-50-E710 Rev 3 Sheet 1

D-50-E2005 Rev 3 Sheet 3

D-50-E2006 Rev 2 Sheet 2

D-50-E2006 Rev 3 Sheet 3
D-50-E2005 Rev 3 Sheet 4

D-50-E2005 Rev 1 Sheet 8

D-50-E2003 Rev 4 Sheet 6

D-50-E2005 Rev 4 Sheet 7

D-50-E2005 Rev 1 Sheet 8

D-30-E402 Rev 10 Sheet 6

D-50-E402 Rev 7 Sheet 5

D-50-E2005 Rev 3 Sheet 1

58V-735 MO Valve

142-MO Valve

54V-057MOA-7521-M

54V-057MO EB-1

057-MO Outline Dimensions

58V-735MO-Seal

142-MO GA 3/1700/4/2

Safety and Loss Control Directory Section 1: Work Safety

(continued)

Documents Received From Alyeska
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Fire and Safety Inspection Program: Work Safety

TAP Control System

PS 5 Line Volume Blance Tests, April 17-May 13, 1992 Rev 1 Dec 23, 1992

PS 5 Line Volume Balance Tests, April 17-May 13, 1992 July 14, 1992

QUIP'S/IR Checklist

Documentation Memo

Standard Inspection Procedure Terminal Work Orders Rev 0

Standard Inspection Procedure Terminal Work Orders Rev 1

T-SIP-004, Rev 2, dated 7/19/93

ISM-CI-108-008: WO #V-9106429/TANKS 55/58, Liner Test Sites

ISM-CI-187-065, WO #9301236, 3" Discharge Piping #51-P-5A

ISM-CI-187-014, WO #9301583 Fire Foam Piping Repair 55 TK-16

ISM-CI-108-038: WO #V-9302138/Excavate and Backfill Tanks 1 & 2, 2"

ISM-CI-157-024, WO #9303004, C-Boiler Hydrotest

Miscellaneous NEC Violations in Room 112

NEC Violations under Computer Floors

NEC Violations Above Suspended Ceilings

Misc NEC Violations at OCC in Rooms 111, 120, 121 and Panel SOF in Room 110

Misc NEC Violations in ERB Lab #110

Misc NEC Code Violations at ERB-Switchgear and Associated RMS

NEC Violations in PDC #14 and Associated MOVs

NEC Violations in PDC #14 (4160 GEAR) & Impound Pump Bld. (continued)

NEC Violations in Cable Tray System

Misc NEC Code Violations @ ERB-Switchgear & Associated RMS

DWG No 18164-L-1093-A

Valdez Term. W/.O 9112400-7/9112411/9112417

D-54-E354 Rev 8 Sheet 3

D-50-E366 Rev 6 Sheet 5

D-54-E354 Rev 6 Sheet 18

D-54-E352 rev 9 Sheet 3

Facilities and Hardware 2.1 Inspection Programs

Alyeska Safety and Loss Control Directory

PM Task Assignments Task # 18057/K06

PM Task Assignments Task # 183605/M01

PM Task Assignments Task # 180296/K08

PM Task Assignments Task # 180298/K09

58-SL-BD

PM Task Assignments Task # 180297/Y01

PM Task Assignments Task #180296/K06

PM Task Assignments Task # 180296/M01

Fire & Safety Departments

Documentation Memo Report # 39034

NEC Violations in the Main Fire Water Building

Unform Fire Code

Non Conformance Reports Memo Numbers 70009, 70010, 70011, 70007, 70018, 70019, 70020, 70021, 70022, 70036, 70040, 70044

(continued)

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Lack of approved "Issued for Construction" Specifications

Docuamentation Memo Discrepancy Report #2842

T-4517 Specifications OSHA

BWT Aeration Tank Expansion

Terminal Work Order 9120309-89013

SA-38

Area Location for the Marine Terminal

Welding Performed by Unapproved Welder

Repair-Welding with no Preheat on Annular Plate

Spent Final Wash Water not Checked for Chlorides

Lack of Approved Issued for Construction Specifications

Dry Film Thickness average (DFT)

Welding performed by Unapproved Welder

Houston Welder HCC-516 Welding without approved qualifications

Welding by Non-Qualified Welder

T-4517 Specifications-OSHA

BWT Aeration Tank Expansion T-4517

D-53-T3527-M101 Rev 3
D-58-C48 Rev 3 Sheet 3

Memo: Replace Batteries for Navigation Lights on Berth Dolphins-W/O V9110932

Materials List from Memo

Batteries

Batteries AS 10-2

(continued)

LPE Industrial Tray Cable A-33--11-07

XLPE Industrial Tray Cable A-33-11-05

PM Task Assignments Task: 180280/M01

D-55-M13 Rev 2

PM Task Assignments TAG # 54-D-2A Task: 181412/Y04

PM Task Assignments TAG # 54-R-54-1 Task: 183183/M02

PM Task Assignments TAG # 58-P-4 Task: 180409/M01

PM Task Assignments TAG # 51-PDC-14-EL Task: 180400/M03

PM Task Assignments TAG # 51-EE15-64 Task 183066/Y01

PM Task Assignments TAG # 51-SU-92 Task: 180406/Y01

PM Task Assignments TAG # 51-EE01-64-2 Task 183066/01

PM Task Assignments TAG # 51-EE15-MTRS Task 183080/Y03

PM Task Assignments TAG # 51-EE01-PCB-24 Task 18037/Y05

PM Task Assignments TAG # 51-EE01-PCB-52-2 TASK 18307/Y05

PM Task Assignments TAG # 51-EE091-51-1 TASK 183052/Y01

PM Task Assignments TAG # 51-EE01-PCB-52-1 TASK 183037/Y05

PM Task Assignments TAG # 51-EE01-51-2 TASK 183052/Y01

PM Task Assignments TAG # 51-EE01-51-2 TASK 183052/Y01

PM Task Assignments TAG #51-P-31A TASK 180406/Y01

PM Task Assignments TAG # 51-EE15-64 TASK 183066/Y01

PM Task Assignments TAG # 51-EE15-MS-3 TASK 183036/Y05

PM Task Assignments TAG # 51-FPCP-PCD 14 TASK 187309/Y01

Volt Meter Panel All Units Part # 460700001

Rectifires RIO
(continued)

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Rectifires Universal

Well Pumps # 445907-4-0661-42-0

PM Task Assignments TAG 54-R-54-1 TASK 183183/M02

Position Description TERM MGR Support Services Code 01389

PSM Management of Change - Form 7019/Slack Line Procedures

Environmental & Regulatory Compliance Program Orientation

Drawing 445907-4-0507-63-0

Drawing 445407-4-0507-68-0

Valdez Terminal Work Flow Diagram Maintenance Engineering As-Builts

AS-Built List Project/Drawe No.

Construction Projects - Drawers 1-15

Contractor Safety Submittal Requirement Data

QIP'S/IR Check Lists Projects # T-6443, Firewater Systems Investigation

QIP'S/IR Check List Projects # A-015, Installation of Flu Gas Coolers

QIP'S/IR Check List Projects # T-6242, Berth #5 Recoat

Quality Assurance - QA NO: 173851 AREA/T-3699 Date: 8/9/93 #93-KWG-037

PM Change Request Task # 183605 TAG # 75-LA-4-1/74-LA-4-1/73-LA-4-1/72-LA-4-1

Procedure for Complete Rebuild of the Isolating Flanges

NFPA 20 Standard for the Installation of Centrifugal Fire Pumps annual Fire Pump Test

20" Fire Foam Systems Inspection Memo

InsepctionSummary
(continued)

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MemorandumsCl-187-057/Cl-187-063/Cl-187-066/Cl-187-064 /Cl-187-056/ Cl-187-014 / Cl-192-003 / Cl-187-027 / Cl-187-022
General Inspection
Reports:Cl-182-324/Cl-187-173/Cl-133-077/Cl-133-080/ Cl-133-091

SV-001 Heritage Contract

SV-02 Preventative Maintenance Manual (Portion)

SV-03ExampleofOutstanding Electrical Work Order/Partially Comp. Awaiting Parts

SV-04 SERs OD & SOP Table of Contents

SV-05 SERVS Initial Response Check Sheet

SV-06 Asset Register

SV-07 Sample Printouts of P.M.S.

SV-08 All P{MS Scheduled during a 1 month interval

SV-09 Equipment Maintenance History Report

SV-10 Tidewater Corporate Safety Policy Regarding Contraband

SV-11 Maintenance & Repair Policies & Procedures Plan

SV-12 PWS Tanker Spill Prevention & Response Plan

Thompson Pass Slack Line Fill Final Procedure

Memo from R. A. Elliott to R. Shoaf, dated October 14, 1993 re: BLM Assertion that an Employee was Intimidated, including

Notes and Observations by D. K. Otto, dated 10/6/93 (Attachment I)

Notes and Observations by OSF Technician Interviews, dated October 12, 1993 (Attachment II)

Memo from R. A. Elliott to R. Shoaf, dated October 14, 1993 re: BLM Assertation that Alyeska "stuffed" files, including:

P4142 PS Potable Water Treatment Improvement Safety Plan (Attachment I)

P4142 Job Specific Safety Plan (Attachment II)
(continued)

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Record Log Sheet (Attachment III)

Quality Inspection Plan (Attachment IV)

Notes and Observations by D. Otto, dated 10/6/93 (Attachment V)

Notes and Observations, OSF Technician Interviews, dated October 12, 1993 (Attachment VI)

Memo from R. Lansing to T. Karnowski, dated 9/10/93 re: Status Report 9/10/93, PWR Internal Audit (Attachment VII)

Categories 2 and 3 PWRs and Recommendations

Note regarding BLM request for information

BLM September 7, 1993 request with handwritten notations

1993/1994 Projects Schedule

QAS Summary

Memo from R. A. Elliott to R. Shoaf, dated October 14, 1993 re: BLM Assertion that Alyeska "Stuffed" files, including:

Notes and Observations by David Otto, OSF Technician Interviews Conducted by Richard Elliott and David Otto

Chronology prepared by R. A. Elliott, signed October 15, 1993

A005 OCC Cable Upgrade Safety Plan

Memo from M. E. Hines/J. H. Freie to R. Wolk, dated October 14, 1993 re: Investigation Report

Memo from R. A. Elliott to R. Wolk, dated October 19, 1993 re: QSF Investigation Report

Summary Report, Basis for Earthquake Design for the Trans Alaska Pipeline System, Appendix A-3.1051a, dated September 1973

Denali Fault Design for the Trans-Alaska Pipeline System, Appendi A-3.1006, Rev 1, April 1975

Engineering Design Procedures for the Trans Alaska Pipeline, dated September 24, 1973

(continued)

Documents Received From Alyeska
BLM/QTC TAPS Audit September/October 1993

Summary Report, Design Criteria and Stress Analysis for the Trans Alaska Pipeline, dated December 18, 1972, Revised September 14, 1973, Appendix A03.1080

Pressure Safety Valve; Task #161271/Y02; TAG # 40-PSV-9A complete pacakage

Work Order Procedures, 10/19/93, with MAXIMO graph by Susie Finney

Corporate Policies, Field Modification Documentation, N-2.00

Pipeline Operations, Department Operating Procedures, Documentation of Field Modifications, Rev. No. 1, N-2.00.03, Issue Date: 10/01/86

Quality Program Manual, QA-36, Rev 7, dated 10/340/92

Audit Finding Report, Audit No. 93-A06, finding Nos. 1-8

Bi -Monthly Towing Gear Inspection; 9/4/93, Memo by J. F. MCHale to Vessel Masters.

Tanker Assist Exercises

Prince William Sound Disabled Tanker Towing Study, Part 1 evaluation of Existing Equipment, Personnel and Procedures; August 1993

Attachment A from QS-97, Technician Certification for Pressure Safety Valve and Pressure Relief Valve Testing, Repair and Certification (pgs 1-5)

Pressure Releieving Device Tester's Certificate for M. Prevost, No. A-497

Pressure Relieving Device Tester's Certificate for M. Prevost, No. A-497, Expiration 10/31/93

Attachment A from QS-97, Technician Certification for Pressure Safety Valve and Pressure Relief Valve Testing, Repair and Certification (pgs. 1-5)

Pressure Relieving Device Tester's Certificate for M. Prevost, No. A497, Expiration 10/21/94

Pressure Relieving Device Tester's Certificate for M.Prevost, No. A-497, Expiration 10/31/94
(continued)

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Evolution of the Quality Assurance Department, undated

Alyeska Organization Chart, dated April 1993, pages 1 through 4, 9-10

Control & Quality Assurance Department Includes Controller/Treasurer and A Quality Assurance Function

Alyeska Organization Chart engineering Department, July 11, 1990

Alyeska Engineering Department Organization Chart, dated 11/20/89

Profs from M. Ellingboe to J. Freie, Dated 2/8/91, re: supervisor Changes

Engineering Department Organization Charts, dated September 22, 1989 and january, 1989

Memo from I. Henman, dated may 118, 1988, re: Organizational Announceement

Alyeska Engineering Department Organization Charts, dated 7/87 and 1/88

Memo from F. Dornheim, dated 6/4/85 re: Engineering Depart. Organization

Memo from F. Dornheim, dated 3/11/85 re:Engineering Depart. Organization

Alyeska Engineering Department Organization Charts, dated 11/85 and 6/85

Work Orders

V9110161	V9111692	V9111492	V9108429
V9111456	V9112751	V9111960	V9107198
V9110040	V9114266	V9112003	V9110829
V9110102	V9108932	V9112036	V9108281
V9111284	V9108900	V9113145	V9108439
V9110527	V9111384	V9113146	V9110038

(continued)

V9109805	V9111247	V9108438	V9110039
V9110114	V9109323	V9111312	V9110119
V9110520	V9100103	V9113193	V9110369
V9107538	V9110618	V9111388	V9110438
V9108210	V9111951	V9109858	V9110443
V9108268	V9112021	V9106846	V9110444
V9110106	V9113143	V9110832	V9110471
V9110107	V9108704	V9109740	V9111298
V9110109	V9110022	V9109872	V9111104
V9107981	V9110399	V9109873	V9111323
V9108808	V9111284	V9111461	V9111360
V9000062	V9113552	V9108329	V9111490
V9108822	V9112411	V9106816	V9111957
V9108877	V9112404	V9106817	V9113125
V9109403	V9112401	V9106819	V9113154
V9109444	V9106291	V9111317	V911354
V9111063	V9112407	V9112049	V9113524
V9111647	V9110625	V9108383	V9108288
V9111648	V9112402	V9110192	V9108213
V9111649	V9112403	V9111296	V9111311
V9108282	V9111469	V9108405	V9111282
V9108242	V9111375	V9110196	V9113586
V9110031	V9111493	V9110200	V9110430
V9110526 (continued)	V9111494	V9110534	V9113506

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V9113141	V9111495	V9113153	V9113515
V9108408	V9111497	V9113174	V911962
V9110116	V9112017	V9113175	V9111368
V9110118	V9113571	V9111324	V9222486
V9110138	V9110145	V9110144	V9107645
V9110147	V9110182	V9110149	V9111322
V9110300	V9108440	V9110470	V9112778
V9110436	V9109844	V9110113	V910685
V9110474	V9110129	V9108277	V9111458
V9110475	V9112013	V9110276	V9112417
V9110483	V9110108	V9112018	V9106814
V9108416	V9108224	V9111967	V9112410
V9110117	V9112014	V9108367	V9108366
V9113560	V9108285	V9108708	V9112422
V9110158	V9111337	V9110131	V9110849
V9113504	V9113196	V9106238	V9110399
V9110260	V9110130	V9107567	V9113148
V9111396	V9111374	V9110391	
V9108215	V9110282	V9111455	
V9111338	V9108412	V9113163	
V9110612	V9108260	V9108293	
V9110620	V9108411	V9111982	
V9111255	V9108233		